

A British History of 'German Silver': Part II: 1829-1924

Alistair Grant



Fig. 1 *left*: Nickel silver coin. From the "Regular-Issue Alloy Coins Series" of The Elements Coin Collection designed and manufactured by David Hamric for Metallium, Inc., Watertown, Boston, MA: <http://www.elementsales.com/index.html>

Fig. 2 *opposite*: Tablespoon, electroplated nickel silver, made by Needham, Veall and Tyzack, Sheffield, England, ca.1890, L: 20.6 cm, Victoria and Albert Museum, Museum no. M.15-1999. The worn plating on the bowl of the spoon reveals the nickel silver substrate.

Prologue: Part I, 1754-1824

This essay, published over two journals, chronicles the history of the commercial manufacture in Britain of 'German silver' (more commonly known today as 'nickel silver'). Part 1 - The Discovery of Nickel and Development of Nickel Alloys, 1754-1823 was published in Volume 23, 2015, and traced the origins of the scientific and industrial development of the metal alloy in Sweden, Britain, and Germany, from Axel Fredrik Cronstedt's discovery of nickel circa 1751-54 and Torbern Olaf Bergman's subsequent confirmation of the discovery by refining pure nickel in 1775; Gustav von Engeström's blow-pipe analysis of the Chinese cupronickel alloy known as *paktong* in 1776, and the long historical interlude before Dr. Andrew Fyfe's 'Analysis of Tutenag, or the White Copper of China,' which was published in the popular *Edinburgh Philosophical Journal* in 1822.

Despite its scientific shortcomings compared to von Engeström's earlier study, Fyfe's 'Analysis' prompted Prussia's *Verein zur Förderung des Gewerbefleißes* (Association for the Promotion of Trade Diligence) to offer a prize in 1823 to the first commercial manufacturer of the alloy in Prussia.

By 1824, Dr. Ernst August Geitner had begun to industrially produce the alloy that is now almost universally known as 'nickel silver,' which is roughly 65% copper, 18% nickel and 17% zinc. It is the quantity and qualities of the lustrous, silvery-white nickel, which is ductile but also hard enough to take a high polish that makes the alloy look like silver (*Figs. 1-2*).

Geitner founded his business near the nickel-rich cobalt mines at Schneeberg in the *Erzgebirge* (Ore Mountains) of Saxony, so he could not claim the Prussian prize, but he quickly established a new market

for the alloy under the tradename *Argentan*. Within a year, Gebrüder Henniger had begun manufacturing and marketing a similar alloy in Berlin under the tradename *Neusilber*. By 1829, Geitner had founded a large rolling mill to mass-manufacture sheets of nickel silver at Auerhammer in Saxony. Geitner's great achievement was to industrialize the smelting and refining processes used to extract pure nickel as a by-product from 'speiss,' the artificial metallic arsenide, or antimonide, that was a waste product from the cobalt blue sintering operations of the *Blaufarbenwerke* ('blue colour works') at Schneeberg. Geitner then alloyed nickel with copper and zinc to produce rolled stock in the form of thin metal sheets from which metalworking manufacturers could cut, stamp, draw, extrude and machine flatware, cutlery, utensils, or the component parts of hollowware.

Geitner's nickel processing revolutionized the manufacture of domestic and ornamental plated ware. In that same year, the alloy began to be manufactured in Britain for the first time, where it eventually became known as German silver.

Introduction: Part II, 1829-1924.

Part II, published in this journal, chronicles the development of the German silver industry in Britain in the period 1829-1924, and analyses the alloy's commercial application to industrial art and design from the late Regency era through the long Victorian and Edwardian period until the First World War. The essay chronicles the establishment by Percival Norton Johnson of Britain's first nickel refinery on Bow Common and German silver manufactory at Hatton Gardens in London in 1829. It then analyses Johnson's supplier-manufacturer relationship with the successful



family firm of close-platers William Hutton and Son. Working together, Johnson in London, William Hutton in Birmingham and his son William Carr Hutton in Sheffield, the three men established a crucial nexus in the German silver trade that linked the three important metalworking communities of Britain. The essay then examines the commercial growth of the German silver industry in Birmingham, which was begun by [Henry and Theophilus] H. & T. Merry and then greatly developed by Charles Askin, Brooke Evans, and Henry Wiggin. The huge success of Evans and Askin, and then Wiggin who continued their business, supplied a steadily growing demand for German silver in close-plate, fused-plate and electro-plate design in Britain during the 19th-century.

It falls outside the scope of this essay to analyze in detail the globalization of the nickel industry that developed out of the use of German silver in the plated trade in 19th-century Europe and America. During the American Civil War, Joseph Wharton acquired the Gap Nickel Mine in Lancaster County, Pennsylvania and established the American Nickel Works at Camden, New Jersey, and by the 1870s was second in the world only to Evans and Askin as a nickel manufacturer.

The most notable French metalware manufacture to use German silver, or *maillechort* as it was known in France, was Christofle et Cie. Charles Christofle (1805-1863) was the first manufacturer in France to acquire a license to electro-plate under Eklington & Co.'s patent of 1840. After lengthy court proceedings, he secured an effective monopoly of electro-plating in France from circa 1842 at his firm's atelier on rue de Bondy, Paris. Christofle's early electro-plating used a pale-yellow brass (copper/zinc alloy) rather than German silver as

the foundation metal. This was in a large measure due to the expense of importing the manufactured alloy or nickel ore and concentrates from foreign sources, like Britain and Saxony, which was exacerbated by the Imperial Bonapartist regime of Napoleon III's poor diplomatic relationship with Germany especially during the 1860s when King Wilhelm I and Otto von Bismarck united Germany under Prussian leadership.

The discovery of nickel-rich ores in the French penal colony of New Caledonia (Nouvelle-Calédonie) in 1863-4 by Jules Garnier provided a major new source of nickel. However, France's defeat in the Franco-Prussian War and the conditions imposed by the Treaty of Frankfurt on 10th May 1871, which forced the French to make reparations of 5 billion gold francs in 5 years, meant that commercial production of refined nickel and German silver did not develop in France until 1875, when large-scale mining began at Houaïlou and Canala in the North Province of the island. That same year, Christofle et Cie. built a huge new factory complex combining a nickel smelting and refining works, a *maillechort* rolling mill and a flatware and cutlery manufactory at Saint-Denis, near Paris. The first nickel smelter was built in New Caledonia in 1879. The following year, 1880, *Société Le Nickel* was founded and financed by the Rothschild bank and the nickel ores of New Caledonia dominated global production in the 1880s and 1890s.

In 1902, Joseph Wharton exchanged his nickel business for stock in the newly founded International Nickel Company (INCo), at Sudbury, Ontario in Canada. During the First World War, Sudbury nickel was used extensively for manufacturing British artillery in Sheffield, and my essay concludes in that city with a

short reflection on Harry Brearley's discovery of 'rustless steel' at the Brown Firth Research Laboratories in August 1913, and W.H. Hatfield's subsequent addition of nickel in the development of 'stainless steel' between 1916-1924.

The Plated Trade: 'The Sheffield Eternal' and 'The Brummagem Wash.'

Writing in Sheffield, at the same time that Harry Brearley was making his experiments, Frederick Bradbury asserted that during the late 18th-century, fused-plate, which used copper as the foundation metal, had supplanted close-plate on steel so successfully that the art of close-plate had almost died out: '... during all the period of the Sheffield Plate industry, the only means by which this earlier process was kept from entire extinction was its adaptation for the cutting blades and handles of snuffers, adornment of steel buckles, and its employment by the cutlers for the blades of knives. The permanency of close plated articles is dependent on their not being exposed to undue heat or moisture. The blade of a knife or fork plated by this method, if held for a moment in a flame quickly sheds its coating of silver, whilst in a damp atmosphere the metal underneath is liable to rust, and consequently the silver blisters (*Fig. 3*).'¹ Bradbury's statement defined 'the period of the Sheffield Plate industry' by historicising what he perceived as an important regional rivalry in the plated trade in Britain between Sheffield and Birmingham.

Bradbury's chronicle of historical changes in the plated trade was both heavily biased and too simplistic in its causality. He posited that the close-plate trade was far more extensive in Birmingham, where the technique was invented, but it was almost entirely superseded during the late 18th-century by fused-plate, which was invented in Sheffield. In turn, Bradbury claimed, fused-plate was superseded by electro-plate in the mid-19th-century, which was another Birmingham invention. However, the history of such a vast commercial enterprise as the plated trade cannot be reduced to such a simplistic sequence of cause and

effect. Bradbury's primary aim was to historicise and glorify 'the period of the Sheffield Plate industry,' but in so doing he chose to ignore the inextricably close ties between the various regional metalwork communities in Britain, and also the crucial artistic and technical elements that persisted through each historical change.

The history of the plated trade in Britain was the result of the thoughts and actions of a vast multitude of masters and workers, shaped by the flow of path dependency and contingency, actions and knowledge, which cannot be reduced meaningfully to such a simple sequence of cause and effect. The history of the plated trade is defined by a complex set of social conditions and processes that constrained and propelled people's actions, and which requires detailed historical explanations of how individuals at every echelon of the trade (high and low) lived and communicated and worked *together* in the shifting context of conditions, because the progress from one scientific, artistic and industrial mode of manufacture to a newer one is always an aggregation of countless actors and actions. Important issues of status anxiety and regional rivalry have distorted the principles of historical research to oversimplify the history of plated ware in 19th-century Britain.

In his magisterial *History of Old Sheffield Plate*, published in 1912, Frederick Bradbury claimed that the earliest commercial use in Britain of nickel silver, was by manufacturers in the fused-plate trade of Sheffield in 1830. 'It seems that the name German silver was derived from the fact that in the year 1830 a Mr. Guitike, from Berlin, came over to Sheffield with the first sample of this new compound metal.' Bradbury asserted, 'The metal had originally come from China, where its composition had been known to the Chinese almost from time immemorial.'² Mr. Guitike may have been a merchant, looking to export Gebrüder Henniger's metal alloy, known as *Neusilber*, into Britain. However, Mr. Guitike has yet to be identified by historical research and Frederick Bradbury's account of his visit to Sheffield is little more than an unsubstantiated trade anecdote, which no one has ever paused to verify but



has since been oft-quoted. Even scholarly German writers on metallurgy like Richard Joseph Meyer (1865-1939) have repeated Bradbury's account verbatim, without further research to verify the identity of Herr Guitike, who remains elusive.³ In fact, none of the Berlin Address Directories for 1825-1849 (*Allgemeiner Wohnungsanzeiger für Berlin*) list anyone with the surname Guitike.

The historicizing aim of Bradbury's anecdote about the introduction of German silver to Sheffield by Mr. Guitike was to assert how it prompted Samuel Roberts II to file his important patent of 1830 (No. 5963), which specified the interspersion of a thin laminate sheet of the cupronickel alloy between the silver and the copper ingot in the manufacture of fused-plate. Bradbury states definitively, 'Samuel Roberts was the first person to avail himself of this metal, in 1830...' before adding, 'This process lessened the quantity of silver required without impairing durability.'⁴ In fact, the addition of the layer of nickel silver made the laminate far more durable, but what Bradbury deliberately omitted to explain was that the primary purpose of Roberts's patented process was to address the commonplace consumer complaint about fused-plate. This was that when the thin layer of silver became worn through with regular use or over-polishing, the product was ruined by the unsightly blemish of the reddish copper substrate showing through, colloquially known as 'bleeding,' which shabbily exposed any illusion that it was solid silver. In the specification of his patent Samuel Roberts

II made this clear: 'This invention consists in introducing a layer of German silver or other white or light-coloured metal between the silver and copper (or copper and brass) usually constituting plated metal. By this means, whenever the silver is partially or wholly worn off, the defect will be scarcely perceptible.'⁵

Frederick Bradbury was a Master Silversmith, who became a collector and authority on antique fused-plate wares manufactured by Sheffield makers, from its invention in Sheffield by Thomas Boulsover in 1743 until it was largely superseded by Elkington & Co.'s electro-plating process from c.1840 onwards. He was the son of Joseph Bradbury senior (1825-1877) and a descendent of Thomas Bradbury I, who in 1795 became a partner in the fused-plate manufacturers [Thomas] Watson & Co. When Thomas Watson retired in 1831, the firm was taken on and restyled Thomas Bradbury and Son. Through family and business ties, Frederick Bradbury could trace his family firm's origins further back to Matthew Fenton & Co. (later Fenton, Creswick & Co.) who were among the first Sheffield silversmiths and fused-plate manufacturers to register a mark at the city's Assay Office when it was established in 1773.

In 1912, Bradbury, as a collector, was eager to re-evaluate what he saw as the neglected art of fused-plate as an important genre of antique metalware, which had originated and developed in Sheffield (*Fig. 4*). His primary aim was to confer art historical legitimacy on surviving fused-plate articles and thereby

Fig. 3: *facing page*. Nutcrackers, close-plate (silver on steel), England, ca.1825, L: 14.0 cm, Victoria and Albert Museum, Museum no. M.3-1999

Fig. 4 *right*. Coffee pot, fused-plate (silver on copper), Sheffield or Birmingham, ca. 1790, H: 26.7 cm, Victoria and Albert Museum, Museum no. M.208-1920



increase their collectability and monetary value in the burgeoning antiques trade of Edwardian Britain. He was also had a great deal of provincial pride in the fine traditions of artistic and industrial invention of the metalware trade in which he worked in the city and to which his family firm had greatly contributed. So, he added two prefixes to 'Old Sheffield' Plate, like value-adding laminates of silver and German silver on copper, and began his revisionary history with apophysis: 'It is not the object of this work to imbue the public with any exaggerated ideas of either the pecuniary or artistic value of Old Sheffield Plate, but one feels tempted to state that this ware varies far less in excellence of workmanship than any of the contemporary crafts.'⁶

Such rhetorical devices were always a necessary ploy when marketing plated ware, whether promoting fused-plate, close-plate, or electro-plate. They were all highly-skilled and technically complex imitative arts devised to make non-precious metals look like silver. Fused-plate introduced into the British metalware trade appreciable commercial advantages over earlier modes of imitating silver that expedited and industrialized manufacturing processes. Machines like steel dies and fly presses could stamp and pierce complex ornamental designs to mass reproduce a huge array of metal wares, like butter and salt dishes, cake, bread and fruit baskets. Fused-plate made imitation silver goods available to a far broader market and social demographic. It was easier and cheaper to make and provide consumers with the illusion of solid silver at a far lower cost. However, such imitative modes of manufacture needed to constantly counter snobbish detractors in order to convince the paying customer that articles made of copper or cupronickel alloy thinly plated with silver, by whatever method they were coated, were comparable in design and quality to articles of solid silver. Metalware manufacturers have always struggled to enhance the public perception of plated ware.

This is why, in so much of the early historiography of the plated trade, partisan pride in historicizing the achievements of the trade community in one place often led to overstated claims about the primacy of artistry or priority in a crucial invention or innovation, which too often involves the denigration of the contributions of the manufacturers and products of another town.

Status anxiety and a misplaced pride of place has too often distorted the early historiography of the plated trade. The history of antique metalware is a complex nexus of life stories, business histories, object analyses and provenances, which collectively inform and give shape to national and international narratives. Evaluating the historical significance of antique metalware involves situating the means of social connection and knowledge exchange about materials, tools and techniques that have made particular productions possible and necessary, and the manufacturers, trade communities and markets that generated it important.

In 1841, a year after Elkington & Co. patented and began commercially developing electro-plating, A.W.N. Pugin penned a scornful, polemical dismissal of the plagiarized designs, derivative artistry, imitative materials, expedited techniques and newfangled technologies used by the new breed of late Georgian and early Victorian 'silversmiths' that was aimed squarely, and rather unfairly, at the Sheffield metalware manufacturers. 'Silversmiths are no longer artists,' Pugin lamented, 'they manufacture fiddle-headed spoons, punchy racing cups, cumbersome tureens and wine-coolers; their vulgar salvers are covered with sprawling rococo, edged with a confused pattern of such universal use that it may be called with propriety the Sheffield eternal. Cruet-stand, tea-pot, candlestick, butter-boat, tray, waiter, tea-urn, are all bordered with this in and out shell-and-leaf pattern, which, being struck in a die, does not even possess the merit of relief. Like every thing else, silver-work has sunk to a mere trade, and art is rigidly excluded from its arrangements.'⁷

Writing in 1841, Pugin was as-yet unaware of the devastating impact that Elkington & Co.'s electro-plate patent, No. 8147,⁸ filed just a year earlier on 25th March 1840, was to have in ringing the death knoll of 'the Sheffield eternal,' or else he may have redirected his polemic at the electro-plating process. By the end of the 1840s, all but a few fused-plate manufacturers had been driven out of business by electro-plating, which the Sheffield metalware trade had nicknamed with bitter impropriety, 'the Brummagem wash.'

Writing in 1912, Frederick Bradbury felt that history had been unkind to fused-plate, which he stressed was a Sheffield invention, but which was superseded by electro-plate, which was invented in Birmingham, just as the Great Exhibition shone an unprecedented spotlight onto art-manufactures, and art-metalwork especially.⁹ After 1851, a new middle-class mass-market and spectatorship for affordable plated-wares and art-manufactures was avaricious for the luxury of imitation gold and silver, but saw fused-plate as obsolete, and electro-plate as the latest in modern technology.

The subtitle of Bradbury's book conferred an elegiac air of nostalgia on his *Account of the Origin, Growth, and Decay of the Industry*. By rebranding fused-plate as 'Old Sheffield' Plate, and publishing his rather idealized history, which promoted 'Old Sheffield Plate' as an important new genre of antique metalware, it was precisely with the object of imbuing public perception 'with exaggerated ideas' of 'the pecuniary or artistic value' of the surviving examples of all fused-plate originating in Sheffield. By 1912, those articles of fused-plate that had survived the ravages of time and vagaries of taste were becoming scarce and collectible, and Bradbury set about reifying 'the Sheffield eternal.' Bradbury's *History* sought not only to salvage, but to lionize and, above all, establish a promissory currency for *Old Sheffield Plate*. Of course, many articles had already gone to the silver breaker or scrap metal dealer, or else had been remedially electro-plated to

conceal the copper or cupronickel alloy bleeding along the worn edges and on the prominences of 'old' fused-plate.

Almost a century later, Gordon Crosskey's archival research has provided a more objective and reliable historical survey of the fused-plate trade. Eschewing Bradbury's regionalist bias, Crosskey's painstaking scholarly study was especially illuminating in chronicling how the fused-plate trade in both Sheffield and Birmingham had evolved as a tightly-knit community of masters and workers employed in a small network of sole proprietorships, partnerships, and family concerns that were firmly rooted and bound by personal ties, perpetuated by intermarriage and indentured sons.

Crosskey has also shown that for much of its history, the fused-plate firms of Birmingham were as numerous as those of Sheffield, and included sizeable and successful operations like Matthew Boulton (1728-1809) and John Fothergill's (1730-1782) famous Soho Manufactory. Matthew Boulton was the first historically recorded fused-plate manufacturer in Birmingham. By the time of his death in 1809, when the ownership and management of the Soho Manufactory and Matthew Boulton and Plate Company passed to his son Matthew Robinson Boulton (1770-1842), he was one among many plated goods manufacturers in Birmingham, which included large manufactories like that of Boulton's former apprentice Sir Edward Thomason (1769-1849).

By 1833, a government *Select Committee on Manufactures, Commerce, and Shipping* heard evidence from Sheffield manufacturers that '... a great proportion of the [plated] trade has migrated to Birmingham ...'¹⁰ *Pigot and Co.'s National Commercial Directory for 1828-9* recorded 110 distinct plated metal manufacturers trading in Birmingham, listed alphabetically from 'Allgood John' on Vauxhall Lane to 'Worton Samuel' on Snow Hill, including notable manufacturers like 'Hutton Wm. & Son (on steel) 130 Great Charles st.'; 'Prime Thos. (on steel) 18 Northwood st.'; 'Spooner, Clowes & Co. (manufacturers of plated articles) 12 New Market street', and 'Thomason Edward, Church street.'¹¹

Crosskey's historical survey also revealed how, over the course of three to four generations, circa 1745-1845, the fused-plate firms of Sheffield and Birmingham, which were then two relatively small towns centred on thriving local economies based predominantly on small metal manufacturing firms, became increasingly exclusive familial concerns. David S. Landes has shown how during the 19th century the reluctance of such family firms to borrow money, employ key people from external sources, embrace new technologies, or take risks in new ventures, often had dire consequences for the enduring success of highly-skilled and specialised industrial enterprises, like metalware firms. As the 19th century progressed, rapid industrial change, market growth and colonial expansion globalized the trade in ores, metals and products, and personal conflicts, unstructured

governance and poor succession planning in family firms all too often hampered objective decision-making. 'It made it difficult to view techniques and products impersonally, to sacrifice quality to quantity, and, most importantly, to abandon traditional ways when more efficient and profitable tools and methods became available. It placed a premium on personal trust and security, reinforced by local trade connections, non-compete agreements, and manufacturing secrecy, and led to an overestimation of risk in investment decisions.'¹²

Even if future research does positively identify Mr. Guitike and confirm the exact date in 1830 of his visit to Sheffield with a 'sample of this new compound metal,' the fact remains that a version of the nickel alloy developed by Ernst August Geitner at Schneeberg in Saxony in 1823, which he marketed under the tradename *Argentan*, had been in commercial production in London and used in sizeable quantities by a close-plate manufacturer in Birmingham, since the previous year, 1829. It seems most unlikely that such an important development in London and Birmingham, which was of such obvious potential benefit to the various plated trades, would have gone unnoticed by such a successful, well-connected and technically astute manufacturer as Samuel Roberts II in Sheffield.

Percival Norton Johnson: Founder of Britain's Nickel Industry

In 1817, shortly after the Napoleonic Wars ended, Percival Norton Johnson (*Fig. 5*) established a business as a gold assayer in London. In 1822, he moved his operations to 79 Hatton Garden. Sometime between 1826-1829, Johnson travelled to Saxony to learn about mining and smelting from the metallurgical chemist Wilhelm August Lampadius (1772-1842) who was a professor at the famed Bergakademie Freiberg. Established in 1765, the Technische Universität Bergakademie Freiberg is the oldest university dedicated to mining and metallurgy in the world. Johnson then visited the mines in the Erzgebirge to learn about the ores mined there, especially those used to produce vitreous colours, most notably the uranium-rich mineral pitchblende (also known as Uraninite), and cobalt blue. According to Johnson's biographer, Donald MacDonald, he began to import pitchblende from the mines at Sankt Joachimsthal in the Karlovy Vary Region of Bohemia, which had been famed for its silver and other ore mining and smelting since the 16th century.¹³ It is now called Jáchymov and is in the Czech Republic.

Whilst visiting Europe, Johnson was clearly on the lookout for new commercial opportunities and MacDonald recounts how 'His quest for cobalt led him to the famous Blaufarbenwerke at Schneeberg, where other colours were being made beside cobalt blue. There he met a man named Dr. Geitner and found something of even greater interest to him than the cobalt colours. This was the first European manufacture in quantity of the alloy variously known as Nickel Silver, German Silver, Neusilber, Argentan, and (in England)



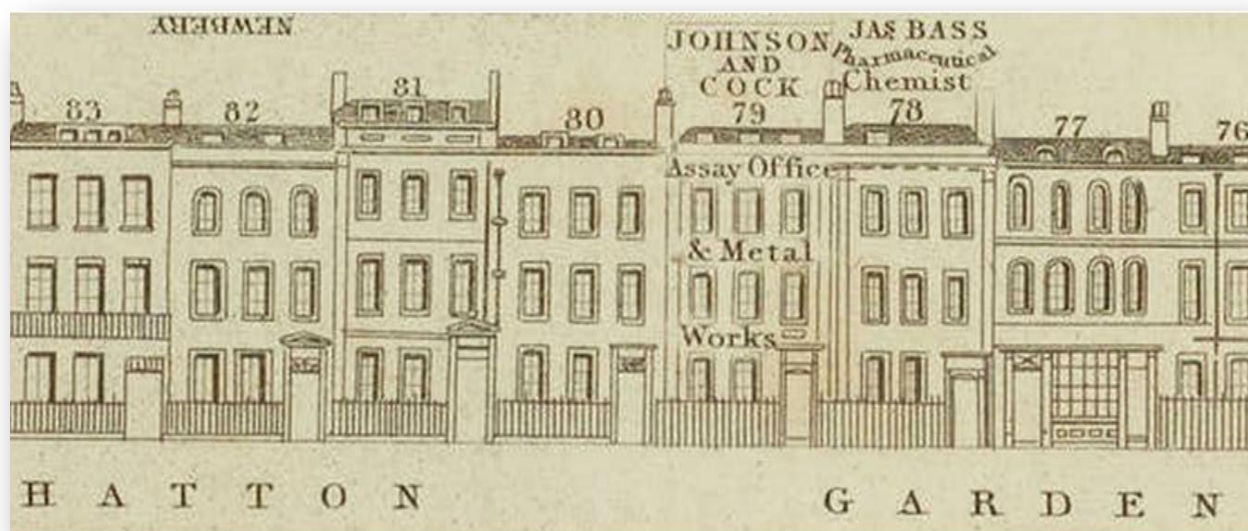


Fig. 5 *facing page*: Percival Norton Johnson, oil on canvas, G.J. Robertson, 1829, Johnson Matthey Media Library, London. Image ID Number 30037. Filename 00519.

Fig. 6 *above*: 'London Street Views, 1838-40' part 33, by John Tallis, detail showing the premises of Johnson and Cock. No. 79 Hatton Garden was Johnson's premises through several partnerships, London Metropolitan Archive, No. v8489495

Albata or British Plate. He decided to make use of this knowledge in England and acquainted himself with the details on the spot.¹⁴ Johnson made arrangements with Geitner to import crude nickel *speiss* from Schneeberg to London and to operate Geitner's method of manufacturing the nickel alloy, which Geitner marketed under the tradename Argentan, in England. *Speiss* was a nickel-rich mixture of impure compounds that also included arsenic, antimony, iron and other metals, produced as a waste product in the smelting of cobalt. The Elbe was navigable by commercial vessels from Dresden to Hamburg, and Johnson contracted the same shipbroker in Hamburg that he had employed to export pitchblende, an agent that MacDonald rather aptly named 'Mr. Handler.'¹⁵ This is probably a misnomer, because *Händler* is the German word for a 'merchant,' and *Händler und Schiffsmakler* was the common trade designation for a 'Merchant and Shipbroker' in German.

The trade in heavy cargoes, like ores and crude *speiss*, was revolutionised in the 1820s and 1830s with the advent of the first seagoing steam-powered trade vessels. The General Steam Navigation Company (GSNC) began regular shipping between Hamburg and London using two seagoing steam vessels in 1825. 'On Saturday, the 30th June, 1825, a steam-packet sailed from the Thames for Hamburg, the first that had ever made that voyage.'¹⁶ Writing a decade later in 1836, Mariana Starke's early guidebook on European travel stated, 'A steam-Packet goes from London to Hamburg, and vice versa, during the latter part of Spring, the whole Summer, and part of Autumn. ... Steam-packets run from London to Hamburg, and vice versa, every Saturday morning ...'¹⁷

GSNC was founded in 1824, and was Britain's leading short-sea shipping line for a century and a half,

and specialised in linking the ports of Britain with northwest Europe. In the late 1820s, alongside passenger and mail services, the British government granted GSNC a license to transport cargo, including the carriage of livestock from Europe, which made the company much of its profits during the 19th century. MacDonald's biography of Johnson's remarkable career shows that he was not only an accomplished metallurgical chemist but also an astute businessman with a roving eye for new business opportunities in mining, refining, alloying and assaying metals. His visit to Saxony was timely because by the end of the 1820s scheduled steamships between London and Hamburg made regular business correspondence and importing cargoes like pitchblende from Sankt Joachimsthal and crude *speiss* from Schneeberg into a logistically viable business.

Donald MacDonald's 1951 biography of Percival Norton Johnson is the most rare and valuable kind of source material for historians of mining, metallurgy and metalware. It documents the life history of one of the most remarkable British figures in the industrial history of metals, a man in whom a restless spirit of scientific enquiry and business enterprise combined to found the firm of Johnson Matthey. The company still develops metallurgy, chemistry, and materials science into technological products, and remains one of Britain's most successful and enduring companies. In 1951, Donald MacDonald was commissioned by the company to write their founder's biography. His book records the inside business story of Johnson's restless development of scientific research into commercial industrial processes.

Johnson's nickel refining and alloying operations lasted only three years before he decided to focus his business activities back solely on precious metals, but

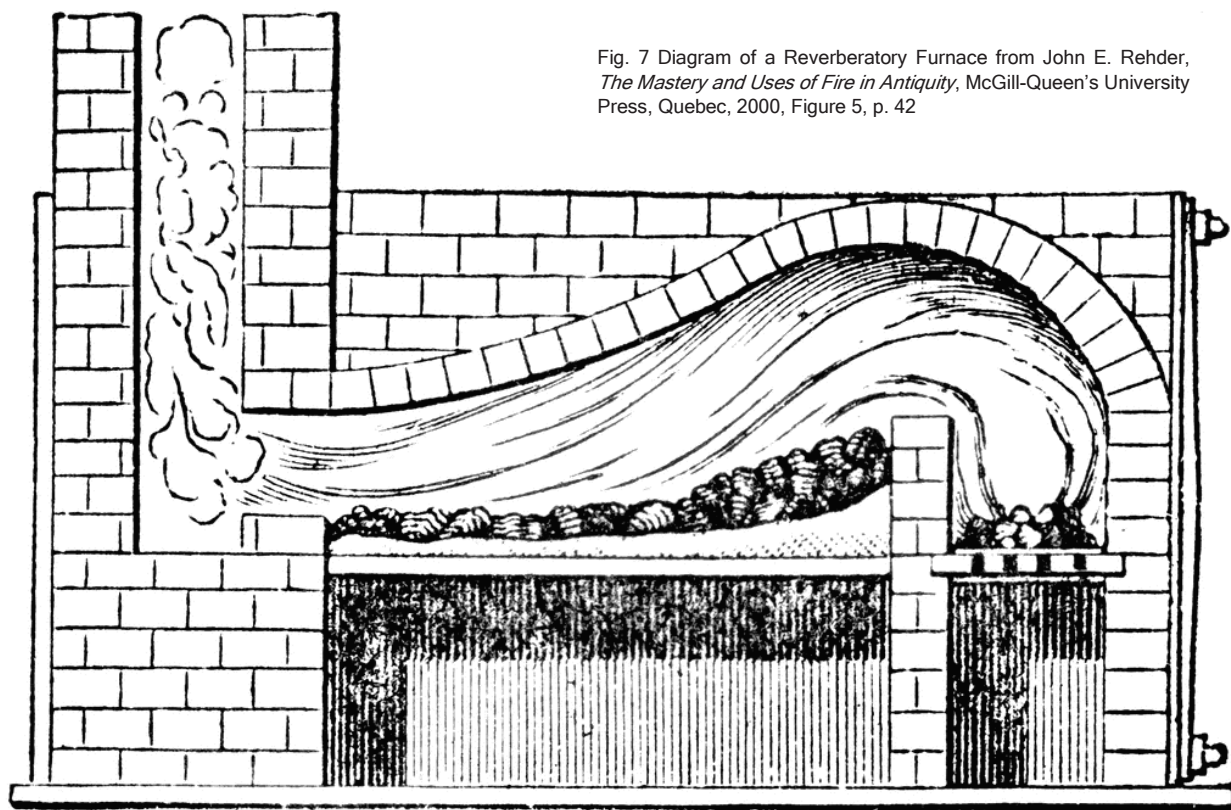


Fig. 7 Diagram of a Reverberatory Furnace from John E. Rehder, *The Mastery and Uses of Fire in Antiquity*, McGill-Queen's University Press, Quebec, 2000, Figure 5, p. 42

in that short period he founded Britain's nickel industry and established the market for German silver. His brief but pioneering venture began an artistic and industrial revolution in the manufacture of domestic and ornamental metalware in 19th-century Britain. However, his involvement with German silver was so short-lived that the only entry of Johnson's business in trade directories of the period appears in *Robson's London Directory* for 1834 (published 1833).¹⁸ Alongside his usual trade designation as an assayer of gold, he advertises his new nickel silver business as 'Johnson and Co., British Plate Manufacturers, 79 Hatton Garden.' (Fig. 6)

So, the original tradename that Johnson used to introduce German silver into Britain was British Plate. It may be that no previous business advertisement exists because it was not until 1833 that his trade operations supplying the nickel alloy to the Birmingham close-plate manufacturer William Hutton was sufficiently established to warrant a trade notice. It is also likely that it was not until 1833 that Johnson and Hutton, working together, hit upon the trade designation 'British Plate' to give their manufacture and application of the new nickel alloy a distinct brand identity that was worthy of advertising.

Johnson's Manufacturing Method

Based on technical information preserved in Johnson Matthey's company records, MacDonald published the first account of Percival Norton Johnson's manufacturing methods (and thereby Geitner's methods) of refining commercial nickel from *speiss* and

then alloying the refined nickel with copper and zinc to make German silver. The scale of Britain's first commercial nickel business was relatively ambitious from the outset, and Johnson clearly anticipated a sizeable market for the alloy in Britain, because he established a new works on Bow Common close to the Regents Park Canal in London. Various chemical manufacturers had based their heavy industrial operations on Bow Common since the opening of the Limehouse Cut in the 1770s. Crude nickel-rich *speiss* from Schneeberg was shipped via Hamburg to London docks to Johnson's main business premises at 79 Hatton Garden.

According to MacDonald, 'On arrival at Hatton garden the material was ground to a fine powder in an edge-runner mill... sifted, mixed with twice its weight of nitre and potash and taken to Bow Common.'¹⁹ There the crushed material was sintered in a reverberatory furnace (Fig. 7), where it was heated without melting it, primarily to remove arsenic, and then compacted into a solid mass of 'cake'. 'The cake was returned to Hatton Garden, where it was washed free from potassium arsenate and sulphate and dried on chalk stones. A given weight was mixed with charcoal dust and borax, charged into a graphite pot with a given weight of sheet copper, melted at as high a temperature as could be obtained, and then a proportion of zinc was added to form the desired alloy.'²⁰

Johnson's version of the metal alloy was 55% Copper, 27% Zinc, and 18% Nickel, which was cast in iron ingot moulds to be sold commercially in 28 lb bars. MacDonald's research states that 'Of this material

Johnson states that he made sixteen tons a year. ... This is the basis upon which claims have been made that Johnson was the first man to refine nickel in England ...²¹ MacDonald supports this statement by citing the Report of the Ontario Nickel Commission in 1917, which stated, 'Johnson of Hatton Garden introduced nickel refining about 1830.'²² The total production of 16 long tons cited by MacDonald was a small but profitable output. The 18% nickel content suggests that Johnson was refining 6451 lbs, or about 2.88 long tons, of pure nickel from Geitner's imported *speiss*.

Perhaps the key phrase in MacDonald's account of Johnson's early process is the reference to the cake being 'melted at as high a temperature as could be obtained.' Nickel has the very high melting point of 1453°C and has similar properties to iron, with which it is often found naturally and from which it is difficult to separate. This made the known ores, which only contained a small percentage of nickel, hard to crush. Extracting and refining nickel from *speiss* was a specialist but lucrative venture. Less than three tons of nickel, and sixteen tons of nickel silver a year was a modest output, but Johnson's commercial venture was the auspicious beginnings of the British German silver industry. 'He undoubtedly functioned on a quite considerable scale for two or three years between 1829 and 1832 and the whole incident is a further instance of his gifts as an energetic pioneer.'²³

MacDonald's research revealed that by far the biggest purchaser of Johnson's alloy was the Birmingham close-plate manufacturer William Hutton (1774-1842) who began using it not as a laminate in the manufacture of fused-plate, but in place of steel as a foundation metal for close-plated flatware, cutlery, and other imitation silver dining utensils and table-ware. 'Among the purchasers of the alloy from Johnson was William Hutton who was a close-plater on steel in Birmingham. ... Round about 1830 Hutton started making nickel silver spoons and forks which he close-plated and sold under the name 'Argentine,' a corruption of the German Argentan.'²⁴

It was in 1830 that William Hutton's 27-year-old son and business partner, William Carr Hutton (1803-1865), moved from Birmingham to Sheffield to establish a branch of the family firm, which was also the same year that Samuel Roberts II's patent (No. 5963) gave rise to the interspersing of a thin laminate of nickel silver by fused-plate manufacturers. William White's Sheffield directory of 1833 records 'Hutton William Carr, plater on steel, and mfr. of dessert and fruit knives, spoons, snuffers, &c. in British plate, 58, Eyre street.'²⁵

In 1951, the primary source of MacDonald's research into this pioneering supplier-manufacturer relationship was business letters exchanged in 1830 between Percival Norton Johnson and William Carr Hutton. 'Hutton's son, William Carr Hutton, started a branch business in Eyre Street, Sheffield, and letters which passed between him and Johnson in that year survive in the possession of his grandson, Professor R.S. Hutton, to whom the writer is indebted for a

considerable amount of this information. These letters indicate that Hutton purchased metal from Johnson and sold him spoons and forks.'²⁶ Although Robert Salmon Hutton (1876-1970), who was a noted electro-metallurgist and Goldsmiths' Professor in Metallurgy at Cambridge University (1931-1942), left a large well-catalogued archive of papers relating to his own academic research and electro-metallurgy business, unfortunately his grandfather's business correspondence does not appear to have been among them.²⁷

William Hutton initially marketed the 'dessert and fruit knives, spoons, snuffers, &c.' that he manufactured in the new alloy under the trade name Argentine or Argentine Plate, which was either an English approximation or misunderstanding of Geitner's trade name Argentan. The adjective Argentine in German is *argentinisch*, and Argentina derives its name from the Latin *argentum*, meaning silver. However, by the early 1830s, Johnson and Hutton were both using the more patriotic trade name British Plate to describe the alloy, and in *Robson's London Directory* of 1833 Johnson is listed as 'Johnson and Co., British Plate Manufacturers, 79 Hatton Gardens.'²⁸

The name may be explained historically by the fact that in the wake of the wave of revolutions across Europe in 1830 Britain too came close to revolution in 1830-32, and the popular resurgence of nationalism that followed the British parliamentary reform of 1832 reached unprecedented heights. However, 1833 was Johnson's first and last entry in the trade directories as a nickel manufacturer, because by the following year he had refocused his business on the assaying of gold, and seems to have abruptly ended involvement the nickel industry he had founded in Britain.

In 1832, Johnson took on George Stokes as a partner and restyled his gold assaying business Johnson and Stokes. George Stokes died three years later in 1835, and in 1837 Johnson took on W.J. Cock as a partner and restyled the company Johnson and Cock. In 1851, George Matthey joined the company and it was restyled Johnson and Matthey.

The following year the firm became Official Assayer and Refiner to the Bank of England. Johnson Matthey remains a successful British multinational company with a Precious Metal Products division that refines, recycles, and fabricates gold, silver, platinum, palladium, rhodium, iridium and ruthenium metals and products.

William Hutton & Son: Birmingham Platers

Holders' Birmingham Directory of 1809 records William Hutton as a close-plater at an address in Cannon Street, Birmingham, and by 1812 the same directory shows that he had entered into partnership as Ryland & Hutton, manufacturers of close-plated steel articles with premises on Paradise Street. Prior to Elkington & Co.'s development of electro-plating in 1839-40, the best commercial method of plating harder and more durable base metals with silver was close-plated steel. This was done by the heat fusion of silver-

ARTICLES PLATED UPON STEEL.

J. BEAUCHAMP respectfully informs the Public, that he is the original Manufacturer of Spoons, Forks, Ladles, Skewers, Nutcrackers, Snuffers, Fish, Cheese, and Butter Knives, Dessert Knives and Forks, Vegetable Forks, Tongs, &c. plated upon Steel, which the experience of Seven Years has evinced to be the most durable, as well as decidedly the very best similitude to Silver ever produced.

J. B. manufactures, in Silver and Plated, Venison open and covered Dishes, Covers, Warmers, Soup and Sauce Tureens, Canteen Articles, Bread and Cake Baskets, Wine Coolers, Epergnes Plateaux, Urns, Kettles, Tea Sets, Liquor, Cruet, Soy, and Egg Frames, Bottle Stands, and an infinitude of other articles; and has always a greater, more elegant, and varied an assortment than is generally to be met with; and he trusts to retain, by the superiority of his articles and the moderation of his prices, the patronage he has by those means acquired. **J. B.** has some excellent New Pattern Waiters (with solid Silver borders, &c.), and has got up, for the present season, a larger and more novel assortment of all kinds of Candelsticks than has ever been exhibited.

Families furnishing, Officers out-fitting, and country Gentlemen, will find many things worthy notice at No. 14, corner of Castle-street, Holborn.

Fig. 8 'ARTICLES UPON PLATED STEEL, John Beauchamp's advertisement in Rudolph Ackermann's *The Repository of Arts*, London, 1814

foil and tin onto steel articles using a soldering iron. A cast or stamped steel article was dipped into a flux of sal ammoniac,²⁹ then immersed in molten tin, covered in silver-foil cut to shape, and then rubbed with a heated soldering iron, causing the tin to melt, and fusing the silver to the steel. Close-plated cutlery and flatware provided a cheap alternative and imitation of sterling silver. As well as flatware and cutlery, close-plating was used to make other durable articles, like scissors, nutcrackers, candlesnuffers, buckles and spurs.

Wrightson's Birmingham Directory of 1815 lists William Hutton, no longer in partnership with Ryland, as a manufacturer of various 'articles upon steel,' and still in the same premises on Paradise Street, and describes the large array of 'articles in imitation of silver' that he manufactured. 'Hutton, William. As manufacturer of various articles upon steel, viz. dessert knives and forks, fish, vegetable and butter knives, nutcracks, snuffers, skewers, cheese scoops, four pronged table and dessert forks, table, dessert and teaspoons, sallad [sic.] and gravy spoons, soup and sauce ladles, asparagus tongs, grape scissors, &c, &c,

and various other articles in imitation of silver, Paradise Street.'³⁰

By 1818-20, *Pigot's Council Directory* lists William Hutton as having entered into another partnership styled Hutton & Houghton, 'manufacturers of plated articles,' and still on Paradise Street. In 1821, William Hutton is entered simply as a plater of Fleet Street, but by 1823, 'William Hutton & Son, Platers' address is given as 130 Great Charles Street. In 1839 and 1841 William Hutton was still at Great Charles St., which was his address when he died in 1842.

John Beauchamp: Plater on Steel

An interesting comparison can be made with William Hutton's contemporary John Beauchamp (1781-1852), who was also advertising himself 'plater upon steel' and subsequently a British Plate Manufacturer in London, which provides an illuminating glimpse into how manufacturers of close-plated steel articles expanded their business offering to develop the market for German silver in Britain. John Beauchamp is little known now, even by antique metalware scholars or collectors, and is better remembered by literary

scholars as the great-grandfather of the novelist Katherine Mansfield (1888-1923). As the patriarch of a family of four sons that emigrated to New Zealand she wrote of him as the 'Original Pa Man,' but John Beauchamp could trace his family business far back to London goldsmiths visited by Samuel Pepys in 1660. 'I went to Cheapside to Mr. Beauchamp's, the goldsmith, to look out a piece of plate,' recalled Pepys, '...and did choose a gilt tankard.'³¹

His earliest business advertisement on his own account appears in London's *Morning Post* on Thursday 24th December 1807, 'New Manufacture. J. Beauchamp, Silversmith, No, 14 Holborn, begs to introduce to the notice of captains, tavern keepers and the public in general his soup ladles, fish knives, skewers, forks &c., plated on steel which for beauty and durability entirely excel anything ever yet offered. As J.B. now has license to use a mark similar to silver it is impossible (in many of the articles) for the most scrutinizing eye to discover the difference.' Despite coming from a family tradition of silversmiths, the advertisement promotes the 26-year-old Beauchamp as newly established in the plated goods trade.

Moreover, although he was clearly advertising close-plated steel utensils he still styled himself a silversmith. Again, this reveals the status anxiety that manufacturers and retailers of plated goods had in relation to traditional silversmiths. The advert's primary message was the similitude of Beauchamp's close-plated articles to 'real' silverware, with the aim of convincing consumers that they were difficult to discern from [sterling] silver. Beauchamp was also risking rebuke by the Goldsmiths' Company Assay Office by advertising that the mark stamped on many of his articles was so similar to a silver hallmark that '... it is impossible ... for the most scrutinizing eye to discover the difference.'

The advertisement's secondary message promoted the 'beauty and durability' of his close-plated steel articles to solicit large orders from 'ships captains and tavern keepers,' in what today we call the food service and catering sector, where articles saw heavy usage and real silver might be stolen.

By 1814, Beauchamp was placing regular advertisements in Rudolph Ackermann's monthly periodical *The Repository of Arts*, which claimed that after seven years in business the durability of his plated steel had stood the test of time and was '... decidedly the very best similitude to silver ever produced.' (Fig. 8)

'ARTICLES PLATED UPON STEEL. J. Beauchamp respectfully informs the public, that he is the original manufacturer of spoons, forks, ladles, skewers, nutcrackers, snuffers, fish, cheese, and butter knives, dessert knives and forks, vegetable forks, tongs, &c. plated upon steel, which the experience of seven years has evinced to be the most durable, as well as decidedly the very best similitude to silver ever produced.'³²

By 1815, John Beauchamp was advertising himself as a close-plate manufacturer with premises at 14 Holborn, London. He registered a maker's mark at

Goldsmiths Hall in 1828 and styled himself a 'plateworker,' and was then also working in Britannia metal. On 20th January 1833, the painter John Constable wrote a letter to his friend, Charles Robert Leslie (1794-1859) describing a visit he had made with his sons to John Beauchamp's 'manufactory of British plate in Holborn'. Leslie had introduced Constable to Beauchamp and included the letter in his famous *Life* of Constable published in 1843: 'My dear Leslie, I went with John and Charles to Mr. Beauchamp's last evening; their delight was great, not only at the very great kindness of Mr. and Mrs. Beauchamp and the boys, but at the sight of almost all that was to their heart's content: forges - smelting pots - metals - turning lathes - straps & bellows - coal, ashes, dust - dirt - & cinders; and everything else that is agreeable to boys. They want me to build them just such a place under my painting room; and had I not better do so, and give up landscape painting altogether?'³³

The 1840s London directories list Beauchamp as a British plate manufacturer, but like many others in the metalwork trade and unlike Hutton, he failed to make the technological leap to electro-plating and his business failed in around 1848. However, it is worth emphasizing that besides the sector-specific crisis caused by the scientific paradigm shift and commercial growth of electro-metallurgy in the 1840s, fused-plate and close-plate manufacturers were also hit hard by the general economic climate in Britain. In 1848, the metalwork trade was decimated by the 'Panic of 1847,' a relatively minor banking crisis caused by the collapse of the speculative bubble of the 'railway mania' in Britain during the late 1830s and early 1840s. However, the short-lived crisis in the money market was followed by a harsh recession known as the 'Commercial Crisis', which resulted in the widespread failure of many business houses. In the metalwork trade, thousands of workers were thrown out of employment into misery and starvation. John Beauchamp's eldest surviving son Henry Herron emigrated to Mauritius before moving to Sydney, Australia. His next eldest son, Arthur, emigrated to Wellington, New Zealand to take advantage of land acquired as a speculative investment in 1839 by his aunt, Jane Beauchamp.

William Carr Hutton: Sheffield Electroplater

In 1830, William Hutton's 27-year-old son William Carr Hutton left his father's employment to establish a branch of the family firm in Sheffield. When his father William Carr Hutton transferred all of the firm's business operations to Sheffield (Fig. 9-10). The following year he was among the very first Sheffield-based manufacturers to begin electro-plating under license to Elkington's patent, taking out a license to operate the new method in Sheffield on 14th June 1843. He very quickly shifted the firm's operations from close-plating, the traditional trade he had learnt from his father, to electro-plating.

Because he was already using German silver as the foundation metal of his close-plated products the opportunity cost of embracing the new plating



This page:

Figs. 9 and 10 *left and below*: William Hutton & Sons Factory, West Street Sheffield, now remodelled as student accommodation for Sheffield University. The old side entrance on Orange Street leads to an interior yard indicating the scale of the factory buildings. Pictures courtesy of West One Student Accommodation, Property Developers & Professional Landlord, Sheffield.

Facing page:

Fig. 11 Newspaper advertisement for William Hutton & Sons, Grace's Guide, 1888



technology was far less than it was for the city's fused-plate manufacturers. Many of those were long-established family concerns, like Samuel Roberts II, who was reluctant to risk a high level of investment in a new and unproven mode of manufacture. By the time of the Great Exhibition in 1851 all but a few fused-platers - T.J. and N. Creswick was a rare exception - had belatedly switched to electro-plating or gone into bankruptcy.

William Carr Hutton was uniquely placed to profit from the new mode of manufacture. Twenty-five-years in his father's close-plating business had given him an astute understanding of the manufacture of articles in German silver and the consumer demand for imitation silverware. Elkington & Co.'s company ledgers in the Archive of Art and Design at the Victoria and Albert Museum confirm that throughout the late 1840s, William Carr Hutton paid some of the highest returns on account of electro-plating licenses. Like Elkington & Co., William Carr Hutton initially used batteries to electro-plate, but through his connections with Brooke Evans and Charles Askin, who supplied him with the German silver he used in his business, he was also the first manufacturer in Sheffield to obtain a license to use John Stephen Woolrich's magneto-electric dynamo instead of batteries for electro-plating.³⁴ In the 1840s, William Carr Hutton was a bold, innovative and

adaptable businessman who did more than any other Sheffield-based manufacturer to introduce and promote the new art of electro-metallurgy among the city's metalworking community (*Figs. 11-12*).

Although based in Sheffield, William Carr Hutton had served his apprenticeship and early career in Birmingham, and through his father and early career knew the metalwork trade there well. Among his family's closest associates were the Ryland family. William Ryland (1804-1877) was employed as a brazier at Elkington & Co.'s electro-plating works on Newhall Street, Birmingham on 7th November 1845. He was 41 years old when he entered Elkington's employment, and he was paid a salary of 33 shillings a week at a time when the national average weekly wage was around 8 shillings. A Memorandum of Agreement reveals that Ryland agreed to work from 8am to 1pm, break for lunch-hour, and then work from 2pm to 7pm.

Ryland was a highly skilled and experienced brazier. According to the 1841 census, he was then living in Matlock, with his wife Ellen Mary, and his father Thomas Ryland, who was aged 72 years. Thomas Ryland was born in 1769, and registered a mark at the Birmingham Assay Office in 1800. By the time of the 1841 census, he described himself as of independent means. He died in Birmingham in 1844, and the following year his son William entered employment with

Silver-Ware.
Electro-Plate.

TRADE MARK—
'WH' & 'S' & 'D'



Nickel Silver.
Britannia Metal.
Cutlery.

TRADE MARK—
'WH' & 'S' & 'D'

W^M. HUTTON & SONS,

LIMITED,

MANUFACTURERS FOR HOME OR EXPORT TRADE.

MANUFACTURERS OF "HUTTON'S" NICKEL SILVER,
ACKNOWLEDGED TO BE THE BEST IN THE MARKET.

WEST STREET, SHEFFIELD;

AND

7, FARRINGTON ROAD, LONDON, E.C.

148 SHEFFIELD ADVERTISEMENTS. [1884]

Observe the Stamp, 



WM. HUTTON & SONS,
MANUFACTURERS OF
SILVER, ELECTRO-PLATED & NICKELSILVER GOODS
OF EVERY DESCRIPTION FOR HOME OR EXPORT TRADE.


SHEFFIELD,
AND
13, THAVIE'S INN, HOLBORN CIRCUS, LONDON, E.C.

Elkington & Co. So it is likely that William was working for his father's business before his death. Thomas was the brother of John and James Ryland, and they were all nephews of the noted Birmingham silversmith Samuel Pemberton (1738-1803). There are surviving balance sheets dated 1811, 1812 and 1813 for a business partnership between John and James Ryland and William Hutton, and Holders' Birmingham Directory of 1812 records Ryland & Hutton of Paradise Street in partnership as manufacturers of close-plated articles.

By employing William Ryland in November 1845, Elkington & Co. not only acquired a talented and experienced brazier, but also a well-respected senior employee with a good family name and close trade connections throughout the metalwork fraternity in Birmingham and Sheffield. Given the increasing animosity they were encountering from the fused-plate trade in Sheffield, whose mode of manufacture was being rapidly superseded by electro-plating, it was a shrewd appointment to the company, and Ryland quickly became an important member of Elkingtons' staff. Circa 1849, he became manager of the Newhall Street manufactory, a post he held throughout the 1850s and 60s.³⁵

Born in 1803 and 1804 respectively, William Carr

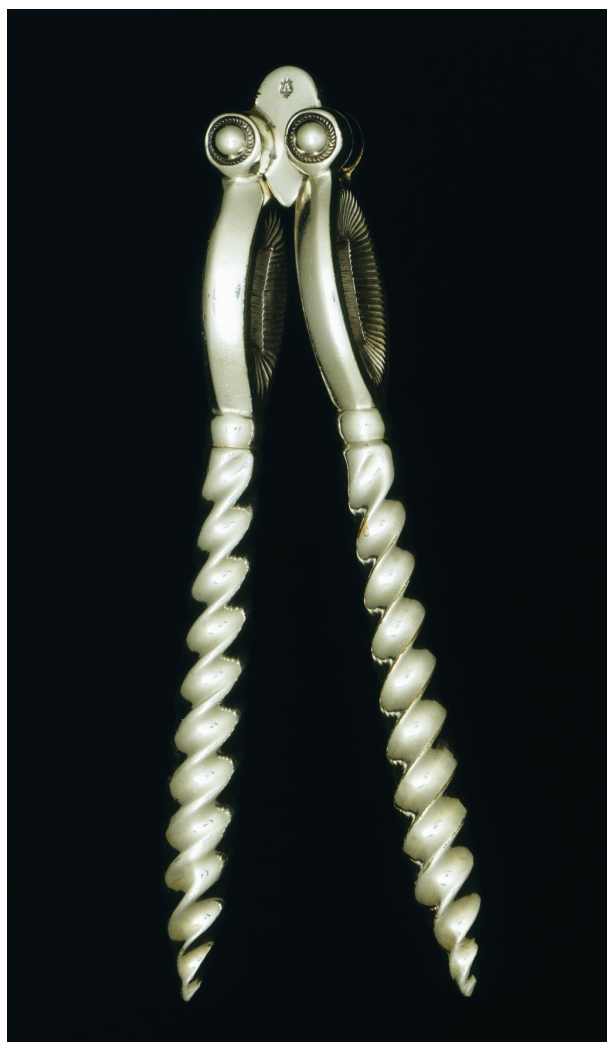
This page:

Fig. 12 Newspaper advertisement for William Hutton & Sons, Grace's Guide, 1884

Facing page:

Fig. 13 *left*: Nutcrackers, silver-plated steel, William Hutton & Sons Ltd., Sheffield 1880-1890 Victoria and Albert Museum, Museum no. M.40-2000

Fig. 14 *right*: Crack Nutcracker, 18/10 stainless steel mirror polished, designed by Alessandro Mendini for Alessi, Italy, 2003, L: 25.0 cm, Alessi Company catalogue number AM26, <http://www.alessi.com/en/products/detail/am26-crack-nutcracker>



Hutton and William Ryland were close contemporaries whose families had strong business ties dating back to the beginning of the 19th century. As a manufacturer of close-plated German silver goods, the logistical adaptation and opportunity cost of introducing electroplating for William Hutton & Son was minimal compared to the established fused-plate manufacturers. Nevertheless, the Hutton-Ryland family connections also explains why, unlike some of the established fused-plate manufacturers in Sheffield, like S. [Samuel] Roberts, Smith & Co. (later W. & G. Sissons) and T.J. and N. Creswick, William Carr Hutton was quick to exchange the old mode of manufacture he had inherited from his father, swapping close-plating for electroplating.

The Manners and Tone of Good Society

In the collection of the Victoria and Albert Museum there is a rare example of electro-plated steel nutcrackers, which were made by William Hutton & Sons some time during the 1880s (*Fig. 13*). Solid silver and even sterling silver are too soft, and are prone to bending and burring when cracking open hard nuts. Good quality nutcrackers were made from harder metals like steel, which was then close plated or electro

-plated. The thin coating of silver gave the object an aura of luxury, and, before the invention of stainless steel, helped prevent the steel from rusting.

Because the plating was thin and soft it often wore through with use. Because they were relatively affordable items the cost of re-plating nutcrackers was probably not as worthwhile as buying new ones, so very few electro-plated nutcrackers survive in such pristine condition as these. Although these nutcrackers appear to be a decorative and luxurious item, they were also an object of utility, and by the 1880s were affordable to many Victorians of modest means. Priced individually, nutcrackers like these would have cost about 10 shillings.

According to Arthur L. Bowley in his economic study of *Wages in the United Kingdom in the Nineteenth Century* published in 1900,³⁶ in the middle years of the 1880s the average annual wage for male workers across Britain was £56/-s/-d and the average wage for all workers was £42/14s/-d. However, for many in the working classes there were seasonal fluctuations in income. Bowley states that a bricklayer could earn up to £2/-s/-d a week during the summer months but struggled to earn 36 shillings during the winter. A more skilled artisan like a stone mason or carpenter might



Fig. 15 Nutcrackers, nut picks, and grape-scissors made by William Hutton & Sons Ltd., in a leather presentation, 'morocco case,' lined with satin and velvet, retailed by L. [Louis] Beaver (*detail*), Sheffield, 1880-90, Victoria and Albert Museum, Museum number M.40-2000. The nutcrackers are electro-plated steel while the nut picks and grape-scissors are electro-plated nickel silver

earn between 25 and 30 shillings a week. Those on the lowest income, like farm labourers in the 1880s only earned about 15 shillings a week, but their work was seasonal and often weather dependent and for many weeks they had a much lower or no income at all.

It is interesting to note that Bowley was unable to accurately record average earnings in the metalwork trade because of the large diversity of skills and modes of manufacture used and for lack of reliable records. 'The manufacture of cutlery and tools is a special trade in a few definite localities; all wages are piece-rates, of which there are some records, but hardly enough to determine weekly earnings, dependent as they are on the inclinations of the workmen.' He also adds that 'The weekly earnings are not, however, directly proportionate to the piece-rates, for in times of inflation a man earns just what he pleases; in times of depression he can scarcely make a living; so that the result obtained will only be correct when averaged over a fairly long period.'³⁷

Measured using a simple Purchasing Power Calculator the relative value of the nutcrackers today would be about £43.50, a reasonable price for a luxury and durable item of domestic metalware.³⁸ An interesting comparison can be made today with the Italian houseware and kitchen utensil retail-manufacturer Alessi, which manufactures and sells the 'classic,' 'iconic' AM26 'Nutcracker Crack' in 18/10 stainless steel mirror polished (*Fig. 14*). Designed by Alessandro Mendini in 2003, it remains one of the firm's perennial bestselling items. It retails for £46.00, which is a comparable price to William Hutton's nutcrackers. In its marketing copy, Alessi identifies the object with the distinct name, 'The Nutcracker Crack,' and, alongside its own brand identity, draws the consumer's attention to the name and artistry of the object's industrial designer. 'The Nutcracker Crack, with its onomatopoeic name, was designed by Alessandro Mendini and it is easy to hold and use. Its design represents the characteristic world of Mendini objects.'³⁹

During the 1980s, under the direction of Alberto Alessi, the company became strongly associated with marketing 'designer' objects, otherwise commonplace utensils that are manufactured and retailed as high specification design objects with publicity campaigns that foreground the celebrity of designers like Achille Castiglioni, Richard Sapper, Michael Graves, Ettore Sottsass, Alessandro Mendini and most famously Philippe Starck. Alessi's aim was to differentiate the family brand from increasing competition by more cheaply mass manufactured metalware and plasticware. Designer objects like Alessandro Mendini's 'Nutcracker Crack' and Philippe Starck's 'Juicy Salif' juicer use much the same marketing ploy as Henry Cole (1808-1882) had from 1847-1850, when he produced Felix Summerly's Art Manufactures, which aimed to improve public taste in Britain by commissioning well-known artists to produce designs for manufactured articles for everyday use.

In the 1880s, William Hutton's nutcrackers had no such 'designer' pretensions and were sold as part of a boxed set that also contained grape-scissors and two nut-picks in a leather presentation box lined with satin and velvet, which was known as a 'morocco case.' (*Fig. 15*) The grape-scissors and nut-picks are made of German silver. Priced individually, the grape-scissors would have cost about 13s or £56.50, whereas a solid silver pair of grape scissors, presented in a case, would have cost £3 7s 6d or around £293. Rather than the manufacturer's 'brand' name, or the name of the designer, it is the retailer's name, 'L. Beaver' that is printed inside the lid in gold, which was the trademark of Louis Beaver, a successful Manchester jewellery and silverware store.

It is interesting, but by no means unusual, that the retailer's name and not the maker's trademark appear on the box. Victorian and Edwardian consumers tended to have a far greater awareness of and customer loyalty to their local retailers, which were the point of sale, rather than specific manufacturers, unless they were large national or multi-national retailer-manufacturers like Elkington & Co, who had retail showrooms in every major city in Britain.

Ornamental grape-scissors and nut-picks have rather fallen out of fashion and common domestic use, but, along with the toast rack, nutcrackers remain the most quintessentially British of silverware items. Developed at a time when imported nuts were an exotic and expensive luxury item, they have somehow remained an almost clichéd mainstay of luxury domestic metalware, which are still used and displayed occasionally, especially at Christmas time. There are five edible nuts that grow in the UK but only three are worth gathering and eating: hazelnuts, sweet chestnuts, walnuts. In his table displays for National Trust properties like Polesden Lacey, Ivan Day has shown how the wealthier classes had walnuts gilded, and how kitchen servants carefully pre-cracked the nuts before dinner parties, then repaired the shells with decoratively tied ribbons, so that all the guests need do was untie a ribbon rather than risk a faux pas by ineptly wielding the nutcracker. At Christmas, gilded walnuts were often tied with a narrow red ribbon and hung to the upper boughs of the Christmas tree, with some concealing a small trinket instead of the nut, much like a Christmas cracker.

By the 1880s, the growth of Britain's Empire and global trade had made other exotic nuts an affordable luxury for many Victorians. Other popular exotic nuts that might have been cracked open by these nutcrackers were macadamias, almonds and brazil nuts. There are few objects in any British museum that provide a better illustration of the way in which the tastes, manners, and aspirations of the increasingly wealthy middle-class consumers of Victorian England in the late 19th century were appropriated from the formal etiquette and fashionable tastes of the aristocratic elite (*Fig. 16*). However, nutcrackers, nut-picks and grape-scissors like these are rather rare as



museum objects, because it is only in recent decades that these kinds of industrially manufactured historical artifacts made of German silver or steel by the plated trade have been deemed worthy of curatorial and art historical attention.

In 1932, the French historian Lucien Febvre first articulated the concept of 'history from below' when describing the approach of Albert Mathiez, one of the founders of the *Annales* group of historians. Febvre, Mathiez et al. advocated a '... history of the masses not of stars; history seen from below and not from above, above all, within the necessary framework, in the overarching framework of economic realities.'⁴⁰ In 1938, A. L. Morton's *A People's History of England* popularised the idea of a 'people's history,' but it was not until E. P. Thompson's influential essay 'History from Below' was published in 1966 in *The Times Literary Supplement* that it began to significantly shape academic methodology and historiography and curatorial practice in Britain. History from below focuses on the study of the experiences and perspectives of ordinary people rather than the traditional political history of 'great men.' E.P. Thompson's essay emerged from the Marxist approach of the influential Communist Party Historians Group formed in 1946. In the 1950s and 1960s, the Marxist focus shifted to embrace the perspectives of women's history, black and gay civil rights, oral history, and the views of non-academics.

According to the Victoria and Albert Museum's object catalogue, the boxed set was bought in 2000 as an illustration of dining etiquette which was an important part of the Victorian code of manners in polite

society. The precepts of Victorian etiquette governed almost every aspect of important social events like dining with strict procedural directives and rules of action and moral conduct, which prompted the technical development of specific utensils for eating and serving particular foods such as nuts and grapes. 'The boxed sets made ideal gifts and with the inclusion of nutcrackers and grape scissors enabled diners to eat the fruit and nuts of the dessert course more elegantly.'⁴¹

There are scores of Victorian handbooks and manuals advising on social etiquette, like *The Manners and Tone of Good Society: Or, Solecisms to be Avoided*, which was first published in 1879,⁴² around the time that William Hutton & Sons boxed set of nut picks, nut crackers and grape scissors was made. The book outlined correct conduct at a dinner party, with particular focus on the complicated and changing use of cutlery. The book was clearly marketed at the rapidly growing demographic of educated and literate middle classes who now had the disposable income and upward social aspiration to decorate their homes and acquire silverware to entertain and dine more lavishly. The book's author was anonymous, but the credit appended to the title on the book's cover was 'By A Member of the Aristocracy.'

The success of bestselling books on etiquette, like *The Manners and Tone of Good Society*, and the high volume of sales of objects like the box set of nutcrackers and grape scissors reveal how eager the Victorian middle classes were to appropriate and imitate the social manners and good taste of the

Fig. 16 *facing page*: Formal dining Victorian style. Once the seating order had been established guests were expected to negotiate a complicated sequence of cutlery and drinking glasses as the dinner progressed. Image source unknown (<http://reframingthevictorians.blogspot.co.uk/2016/03/the-dietary-divide-between-rich-and.html>)

Fig. 17 *right*: Oyster fork, electroplated nickel silver with ivory handle, William Hutton & Sons, Sheffield; 1870-1890, L: 15.5 cm, Victoria and Albert Museum, Museum no. M.27-2000. William Hutton & Sons' advertisements claimed they produced 'Every article for the table'. Oyster forks were used to eat directly from the shell.



aristocracy. The display of manners and good taste, whether fully acquired or in partial affectation, were often a thin veneer, like the electro-plate on William Hutton's German silver grape scissors, in self-conscious imitation of the real thing. 'Grape scissors can be very ornate in design, and sometimes have cast vine and grape motifs, which make the implements awkward to use. These grape scissors are quite plain and made in durable electroplated nickel silver, and are therefore relatively robust.'⁴³

The book's title and credit was subdivided into three parts, which together signified how *The Manners and Tone of Good Society* were largely dictated by the *Solecisms To Be Avoided*. The book primarily instructed Victorians on how *not* to behave by listing the litany of embarrassing vulgarisms to be avoided in order not to expose one's lack of class, education, and good-breeding: 'It is needless to say, that to put the knife into the mouth, at any time during dinner, would be an unpardonable offence against good breeding, and would be a mark of vulgarity.'⁴⁴ As many literary and visual social satires during the 19th-century demonstrated, like Melmotte's dinner party in Anthony Trollope's novel *The Way We Live Now*, published in serial and book form in London in 1875, to lose one's social reputation was to become 'déclassé.'

The third part of the title *By A Member Of The Aristocracy* made it clear exactly who wrote, legislated and governed the precepts of Victorian etiquette. Chapter VI on the etiquette to be observed at dinner-parties begins: 'Dinner-parties rank first amongst all entertainments, being of more frequent occurrence, and

having more social significance, and being more appreciated by society, than any other form of entertainment. An invitation to dinner, conveys a greater mark of esteem, or friendship and cordiality, towards the guest invited, than is conveyed by any other social gathering, it being the highest compliment, socially speaking, that is offered by one person to another. It is also a civility that can be readily interchanged, which in itself gives it an advantage over all other civilities.'⁴⁵

Apart from a few foods, like breaking bread, touching and eating food with the fingers was considered vulgar in polite society, and Victorians of good social standing required knowledge and adeptness at the dining table using an extensive array of specialist utensils designed for eating particular foods, especially those that were exotic, imported and expensive (*Fig. 17*). Not possessing or knowing how to correctly use a dining utensil like a nut-pick or grape-scissors, which today seem socially superfluous and faintly ludicrous items of silverware, could ruin one's social reputation.

Once the hard shell of a nut was cracked open using the nutcrackers, a nut-pick, sometimes called a 'walnut peeler,' was used very specifically to lift pieces of shell and prise out and spear the edible kernel to place it in the mouth. Etiquette demanded both ownership and adeptness in using such utensils for serving and eating exotic foods like nuts and grapes. Books like *The Manners and Tone of Good Society* educated and kept people abreast of the growing array of specialist silverware used for dining, and how to recognise and

use utensils like nut-picks and grape-scissors correctly. *The Manners and Tone of Good Society* advised: 'When eating grapes, the half closed hand should be placed to the lips and the stones and skins adroitly allowed to fall into the fingers and quickly placed on the side of the plate, the back of the hand concealing the manoeuvre from view. Some persons bend the head so as to allow of the stones and skins of the grapes falling on the side of the plate; but this latter way is most inelegant, and therefore seldom done.'⁴⁶

By the 1880s, William Hutton and Sons Ltd. was a large and well-known firm of manufacturing silversmiths and electro-platers. William Carr Hutton's eldest son Herbert Hutton joined the firm in 1864 and it was restyled William Hutton & Son (singular). In 1869, they advertised as 'The Sheffield Fork & Spoon Manufactory... Platers and Gilders by Magnetic Electricity, Dessert Knives, Fish Carvers, Nutcrackers & Every Article for the Table.' Shortly afterwards, with the addition of sons Robert Hutton and James Edward Hutton to the business, the firm became known as William Hutton & Sons (plural). The firm acquired the business assets (mainly skilled employees and tools) of Robert Farell and Co., manufacturing silversmiths of London in 1893, and was soon after converted to a limited liability company under the name of William Hutton & Sons Ltd. In 1902, they acquired the famous old Sheffield firm of manufacturing silversmiths, Creswick & Co. However, in 1930, in the midst of the world depression, the company effectively ceased to exist when it was acquired and fully merged into James Dixon & Sons Ltd.

Charles Askin, Brooke Evans, and Henry Wiggin

Donald MacDonald suggests in his business biography of Percival Norton Johnson that between 1834-38, Johnson may have retained an interest in the nickel trade as a silent partner of James Warwick Buckland, with whose family Johnson had a longstanding connection. Buckland first appears as a British Plate Manufacturer in London directories in 1834, and MacDonald suggests this may explain the 'Johnson and Co.' listing of 1833.

However, MacDonald also cites a trade anecdote that explains how and why nickel manufacturing moved from London to Birmingham: 'The [oral] tradition at Hatton Garden is that owing to pressure of other work he [Johnson] handed the business over to Evans and Askin, whether for a consideration or not is not mentioned. ... Johnson's own explanation ... was that 'the alloy had become so successful and appreciated that the Birmingham houses now produced it on a large scale and this rendered it unprofitable for him to continue to make.'⁴⁷ It was perhaps also inevitable given the scale of the plated trade in Birmingham and Sheffield that nickel silver manufacturing would quickly develop in those cities once Johnson and Hutton had developed a market demand for the alloy.

The Birmingham house of Evans and Askin that MacDonald referred to was the firm that would dominate the British history of German silver during the

19th century. Its founder Charles Askin (*Fig. 18*) was born in Cheadle, Staffordshire in 1788, where he began his working life in his father's drapery business. From an early age he was interested in the scientific study of chemistry, and when his father died he sold the drapery business he inherited and left for London where he studied as a veterinary surgeon. On qualification, around 1827, he moved to Birmingham and established a successful practice on Cherry Street, but continued to avidly pursue his personal interests in experimental chemistry. Influenced by the metalwork trades of the town, these interests turned increasingly towards the science of metallurgy.

Whilst living on Cherry Street he became friends with two of his neighbours, who were instrumental in Askin's career change into the German silver business. Henry Merry was in partnership with his brother, Theophilus Merry, as brass founders and picture frame and military ornament manufacturers at 41 Cherry-street, and Henry Evans, who lived at 26 Bull Street and whose back garden adjoined Askin's garden. Henry Evans is frequently referred to as a draper, but *Pigot and Co.'s National Commercial Directory for 1828-9* lists him as a hat manufacturer and dealer.⁴⁸ Henry Evans' sons shared Askin's scientific and metallurgical interests.

In 1832, Askin left his veterinary practice when he was recruited for a position as the manager of a mining and refining works in Mexico belonging to the United Mexican Mining Company. As a condition of his employment he negotiated that he should first visit Germany to study metal refining at the principal mining and refining operations there. After selling his veterinary practice, he went to Germany for a period of six months. Whilst he was studying in Germany, he visited Poland where his neighbour's sons Brooke, Alfred and Douglas Evans had acquired an ironworks. In Poland, he also first became acquainted with Geitner's Argentan, acquiring some forks and spoons made of the nickel alloy. Whilst he was in Germany and Poland, the Revolt of 1832 led to the downfall of the government of Mexico, when General Antonio López de Santa Anna overthrew the oppressive regime of Anastasio Bustamante in December 1832. Despite the election of a more liberal government, the rebellion divided the nation and ended the possibility of a peaceful solution to the national conflict and the problems in Texas.

On returning to England, in consideration of the political unrest in Mexico, Askin withdrew from the offer of employment there and spent the following six months living with his brother in Leamington Spa, who furnished him with a small laboratory in which he analyzed and learnt how to refine and manufacture Geitner's alloy. He showed an ingot of the alloy to his former neighbour Henry Merry, who encouraged him to put it through the steam rolling mill at William Phipson's zinc manufactory on Fazeley Street where they watched with anticipation to see if the alloy was malleable enough to be commercially rolled into sheets.

Askin entered into a partnership with Henry and



Fig. 18 Charles Askin illustrated in *One Hundred Years of Progress: History of Henry Wiggin & Company Ltd. 1835-1935*, The Centenary Publication, Lund Humphries, London and Bradford, 1935, facing p. 13

Theophilus Merry styled H. & T. Merry & Company, and built new premises at Sherborne Wharf, Ladywood in Birmingham to manufacture the alloy, which they marketed as 'Merry's plate.' The business was an immediate commercial success, and H. & T. Merry quickly became Percival Norton Johnson's chief competitor as suppliers of the alloy in Britain.

After about a year Askin left the partnership with his £1500 share of the business. Birmingham directories show that H. & T. Merry continued in the nickel silver business at Sherborne Wharf. *The London Gazette* recorded that the partnership had been dissolved on 2 June 1835. 'NOTICE is hereby given, that the Partnership heretofore subsisting between us the undersigned, Henry Merry, Theophilus Merry, and Charles Askin, of Birmingham, in the County of County of Warwick, Manufacturers of German Silver, was dissolved this day by mutual consent. - Dated this 2d day of June 1835. Henry Merry. Theophilus Merry. Charles Askin.'⁴⁹ Later that same year, Askin established a new business manufacturing the alloy on George Street in Birmingham, backed financially by the three Evans brothers. In practice, Alfred and Douglas Evans were silent shareholders, whilst Brooke Evans managed the commercial side of the business in partnership with Askin, who oversaw its technical operations.

Born at Bull Street, Birmingham in 1797, Brooke Evans (*Fig. 19*) was nine years younger than Askin, but their close partnership established the hugely successful company Evans & Askin, which played a dominant role in the British manufacture of German silver throughout the Victorian years. Designating themselves nickel refiners, metal rollers, and German silver manufacturers, they appear to be the first to name and market the new alloy as 'German silver'. The earliest use of that name for the alloy that I have found is *Pigot and Co.'s National Commercial Directory* of 1837, where they are listed under Metal Rollers as 'Evans and Askin (German silver) George street St. Paul's',⁵⁰ but H. & T. Merry are no longer listed. It is interesting to note that in the same directory there are 24 'British Plate and Albata Manufacturers' listed alphabetically from 'Astley Thomas' to 'Yates John'. 'Hutton Wm. & Son' are among those listed.⁵¹ Besides Evans & Askin, only one manufacturer, Henry & John Gibbs of 7 Little Charles street, describe themselves as manufacturers of plated articles on 'German silver'.⁵²

With 24 Birmingham manufacturers now using the alloy a problem quickly emerged in Evans & Askin's early business model. Like Geitner, Askin's method of refining the nickel he needed to make German silver was from *speiss*, which he obtained as an industrial by-product from cobalt blue used in the English potteries of Staffordshire. With 24 manufacturers using British plate/German silver, the supply of *speiss* from Staffordshire soon proved inadequate to meet the demand for the new alloy that they and Percival Norton Johnson had created. In search of a more reliable and inexhaustible source of nickel, Brooke Evans traveled to Freiburg in Germany, a town famed as the European

centre of mineralogical and metallurgical science, where he was encouraged to travel to the Carpathian Mountains of Hungary where nickel-cobalt-arsenide ore was mined. Evans purchased a considerable quantity of the ore and returned with it to England. The problem was that although the ore was undoubtedly rich in nickel and cobalt, both valuable commercial metals, as well as impurities of copper, iron, bismuth, and arsenic, Askin's method of refining nickel from *speiss* did not apply to the new ore, and required a wholly new method of separating the nickel and cobalt from each other. Askin consulted his friend, the young and brilliant metallurgical chemist Dr. Edward White Benson Sr. (1802-1843), who was then Managing Director of the British White Lead Company, whose works were on Birmingham Heath. Together they devised a method of 'wet refining' using bleaching powder to precipitate the cobalt and nickel in solution to separate the metals. Benson, who was the father of Edward White Benson, 94th Archbishop of Canterbury (1829-1896), died aged only 41 in 1843.

Askin and Benson's wet refining method not only gave Evans & Askin a reliable means of obtaining pure nickel from the Hungarian ore, but also a lucrative trade in supplying pure cobalt oxide, which was also produced in the refining process, to the Staffordshire potteries. Following Thomas Turner at the Caughley works in Shropshire in 1779, and subsequently Thomas Minton, Josiah Spode, inspired by Chinese porcelain designs, developed the Willow Pattern in 1790, which became hugely popular in early 19th-century Britain. Spode was the first Staffordshire potter to introduce underglaze blue printed earthenware on a commercial scale, but he was quickly followed by other major manufacturers, including Wedgwood, Worcester, Liverpool, Lowestoft, Bow, New Hall, Coalport, Vauxhall and Derby.

The main source of cobalt during the 18th century was Saxony, where the government attempted to hold a monopoly of zaffre and smalt production by exporting cobalt blue only in its refined states, not as an unrefined ore, which made cobalt an expensive product. Evans & Askin's cobalt oxide could be used to create a whole spectrum of clean blue tones on porcelain, ceramics, enamels and glassware. Various attempts were made to commercially manufacture zaffre and smalt from British cobalt, but it was not until Evans & Askin established themselves as nickel refiners to manufacture German silver that there was a reliable British source of cobalt oxide to potteries like Wedgwood and Copeland in England, and the Manufacture Nationale de Sèvres in France. '... Birmingham now supplies the principal potteries of this country, as well as several in France including the celebrated works of Sèvres, with oxide of cobalt in a state of purity such as was formerly unknown. The beauty of tint of the recent blue earthenware is entirely due to the purity of the oxide of cobalt employed. By this discovery, the price of cobalt has not only been considerably reduced, but Mr Askin himself realized an ample fortune.'⁵³



Fig. 19 Brooke Evans illustrated in *One Hundred Years of Progress: History of Henry Wiggin & Company Ltd. 1835-1935*, The Centenary Publication, Lund Humphries, London and Bradford, 1935, facing p. 16

It is interesting to note that *Pigot's Trade Directory* of 1837 listed Evans & Askin as metal rollers alongside zinc manufacturers like William Phipson and brass manufacturers like George Frederick Muntz, rather than commercial refiners and wholesalers of specific metals and alloys (placing the metal that they manufactured in parentheses).⁵⁴ Based on the steadily growing demand from the Birmingham plated trade, Evans & Askin's business grew rapidly during the late 1830s, but it was not until 1840 that the market-demand for German silver really increased considerably with the invention and commercial development of electro-plating by Elkington & Co.

Correspondence in the Elkington & Co. archives at the V&A show that Charles Askin was a close business associate of G.R. [George Richards] and Henry Elkington from circa 1839-40. According to William Thomas Brande (1788-1866), Askin as a young man had '... received from his fellow-townsmen the appellation of 'Schemer'.⁵⁵ The Elkington archives reveal that Askin played a central role in introducing and brokering the deal between the Elkington cousins and the Birmingham surgeon John Wright, whose discovery of the crucial electrolyte, potassium cyanide, was incorporated into the Elkingtons' Patent No. 8447 before it was enrolled on 25th September 1840, '...for coating, covering, or plating certain metals with silver by use of a solution of silver... in connection with the application of a galvanic current.'⁵⁶ Chief amongst the 'certain metals' plated by Elkington & Co. was German silver, which became the primary alloy used as a foundation metal for the manufacture of electro-plated flatware, cutlery and hollowware.

If Elkington & Co.'s success using John Wright's electrolyte was in some small measure due to Askin's scheming then it was shrewd business, because Evans & Askin became the major suppliers of German silver to Elkington & Co., and as Elkington's success grew so did Evans & Askin. The demand for Evans and Askin's German silver increased rapidly as other metalwork companies in Birmingham, Sheffield and London began to electro-plate under license to Elkington's patent. German silver was the ideal foundation metal for electro-plating because of its attractive and durable silvery appearance, but also because it could be stamped, spun, cast and wrought, and most importantly rolled into sheets from which flatware and cutlery patterns could be stamped. Elkington's huge commercial success in the 1850s was due chiefly to mass manufacture of electroplated German silver flatware and cutlery at their Brearley Street factory in Birmingham using Alfred Krupp's spoon and fork rolling mill, which he patented in Britain on 26th August 1846.⁵⁷

As the electro-plate industry grew rapidly in the 1840s and 1850s, supply and demand could hardly have been in closer proximity. From 1835, Evans & Askin manufactured German silver on George Street adjacent to the 'Whitmore's Arm' branch canal that led from the Birmingham and Fazeley Canal to the Newhall Hill sandpits. In 1838, Elkington & Co. built their new

gilding manufactory on Newhall Street and the Whitmore's Arm canal passed through their factory site.

In 1840, when they began electro-plating commercially, as well as gilding, the Newhall Street factory was only a few hundred metres by canal or by road along Newhall Street from Evans & Askin. 'Nickel being the basis of German silver, of which metal numerous articles of the day are made, an important and increasing manufacturing trade speedily grew up. The electro-plating process was subsequently introduced, and soon created a further demand for the raw material giving a stimulus to the operations so successfully commenced. And this was supplemented through the fortunate discovery, by Mr. Askin, of a means of separating cobalt from nickel, on a large scale and in an economical manner, so as to render the oxide, hitherto deemed a waste product, valuable preparation for use in pottery and glass making. The scientific knowledge of Mr. Askin was ably seconded by his partner.'⁵⁸

In 1842, Henry Wiggin (*Fig. 20*) joined the firm of Evans & Askin. Like both Evans and Askin, Wiggin was apprenticed and began his early career as a draper. He too was born in Cheadle, where his family were friendly with Askin's family. Charles Askin encouraged the young Henry Wiggin's interests in chemistry and eventually persuaded his father and the drapery firm of Whitlock & Fisher on Bull Street, to whom Wiggin was apprenticed, to transfer his indenture to Evans & Askin. As Askin's apprentice, Wiggin learnt the industrial science of commercial nickel and cobalt refining. 'He also appears to have come under the influence of Dr. [John] Percy, then Professor of Chemistry at Queen's College, and attended lectures at the old Philosophical Institution, with his friend, George Shaw, subsequently the well-known patent agent.'⁵⁹ Sometime between 1842-47, Evans & Askin, much as Percival Norton Johnson had done, moved the heavy industrial ore-refining and smelting operations of their business to larger and more suitably situated premises on Birmingham Heath, adjacent to the British White Lead Company run by Edward White Benson Sr.

In the summer of 1847, Brooke Evans persuaded Charles Askin, who was aged 59 and planning his retirement from the business, to travel to Norway accompanied by a young employee, the metallurgist and chemist David Forbes, to inspect new sources of nickel ores from the mines near Gausdal. On 25th August, Askin collapsed and died suddenly. 'He was buried in the little village where he died, but his friends in this country directed that his body should be exhumed and sent home. It was brought to Christiana, but on arrival there the winter had so far advanced that navigation was closed by ice. The coffin was buried, a second time, in the cemetery of the city. The following spring it was again exhumed, but owing to the superstition of the sailors, who refused to sail in a vessel carrying a corpse, there were considerable obstacles. At length, the difficulty was overcome by extra payment, but the vessel met with a fearful storm in the North Sea and had to be abandoned. It was,

Fig. 20 Henry Wiggin illustrated in *One Hundred Years of Progress: History of Henry Wiggin & Company Ltd. 1835-1935*, The Centenary Publication, Lund Humphries, London and Bradford, 1935, facing p. 29



Fig. 21 Harry Brearley, the inventor of stainless steel, in around 1913, image in public domain



however, brought to Yarmouth as a derelict, and eventually the body found a resting place in the churchyard at Edgbaston, where it lies near to those of his friends and partners, Alfred and Brooke Evans.⁶⁰

Despite the tragedy of Askin's death, the company did subsequently begin mining and smelting nickel in Norway. 'In Norway two smelters were built at Espedalen [circa 1848], some 160 miles north of Oslo. The mines and smelters at Espedalen, owned by the English company Evans & Askin, produced a 22% nickel concentrate in the middle years of the last century.'⁶¹

Simon Clow points out that although there had been mining in the Espedalen area from at least the 17th century, the nickel ores mined in Norway were low-grade, which eventually made its mining commercially unviable. 'Nickel mining began in Norway in 1848 at Espedalen, but serious production commenced in 1872 mainly from the Flåt Mine at Evje to the south west. In the period 1874 to 1876 when production peaked Norway was the world's leading producer of nickel.'⁶²

During the latter half of the 19th century, Evans and Askin were in a continual search for new sources of nickel ores. David Forbes (1828-1876), who had accompanied Charles Askin to Norway was eventually made a director of the firm and travelled the world in search of new sources. 'During this time, he became a partner in the well-known firm of Evans and Askin, nickel smelters, Birmingham, and it was in connection with them that he visited Chile, Peru, and Bolivia, in search of nickel and cobalt. His investigations into the mineral resources of these countries extended over six years.'⁶³ It is interesting to add that because of technical improvements in the extraction of nickel from low-grade ores and the global demand for nickel, in 2012, the Australian gold and base metals explorer Drake Resources (DRK) applied for and was granted significant exploration claims in the Espedalen nickel-copper district.

Charles Askin seems to have regarded Henry Wiggin as his son and heir and remembered him in his will. In 1848, the following year, although Wiggin was only twenty-four years old, Brooke Evans made him a partner in the firm. Evans continued the management of the business until he died on 15th September 1862, and Henry Wiggin took over sole control of the company circa 1865. When Alfred Evans, the last of the three Evans brothers died in 1870, Evans & Askin was restyled Henry Wiggin & Company. 'Between the years 1840 and 1870, the Evans-Askin-Wiggin combination held almost complete control of the nickel industry in this country, and although elements of competition entered in from time to time, the technical skill and experience of these workers put them well ahead of all competitors in the refining of both nickel and cobalt as far as this country was concerned.

It must, however, be pointed out that up to the year 1870 the total Wiggin production of nickel did not in all probability amount to more than about 200 tons per annum.'⁶⁴

From 'German Silver' to 'Nickel Silver'

Until the early years of the 20th century, German silver remained the primary alloy used for manufacturing plated flatware, cutlery and hollowware. However, by the late 1880s Germany's continental dominance as a military, economic and industrial power led to growing anti-German sentiment in Britain. The Merchandise Marks Act of 1887 required that the country of origin should be marked on any imported goods in order that British consumers could identify where foreign produce had come from more obviously.

The 'Made in Germany' merchandise mark indicated to British consumers that a product had been manufactured in Germany. Public outrage was heightened by alarmist news coverage of various international incidents like the Kruger telegram in 1896, in which the Kaiser offered encouragement to the Boers in their conflict with Britain, and provoked attacks on German sailors and the windows of German-owned shops in London. In 1906, the publication of the bestselling novel *The Invasion of 1910* by William Le Queux and H. W. Wilson, which was serialized in *The Daily Mail*, created widespread public fear of German militarism that climaxed in the Naval Scare of 1908. In the decade before the war, the metal trades' research and development and production was focused on armaments.

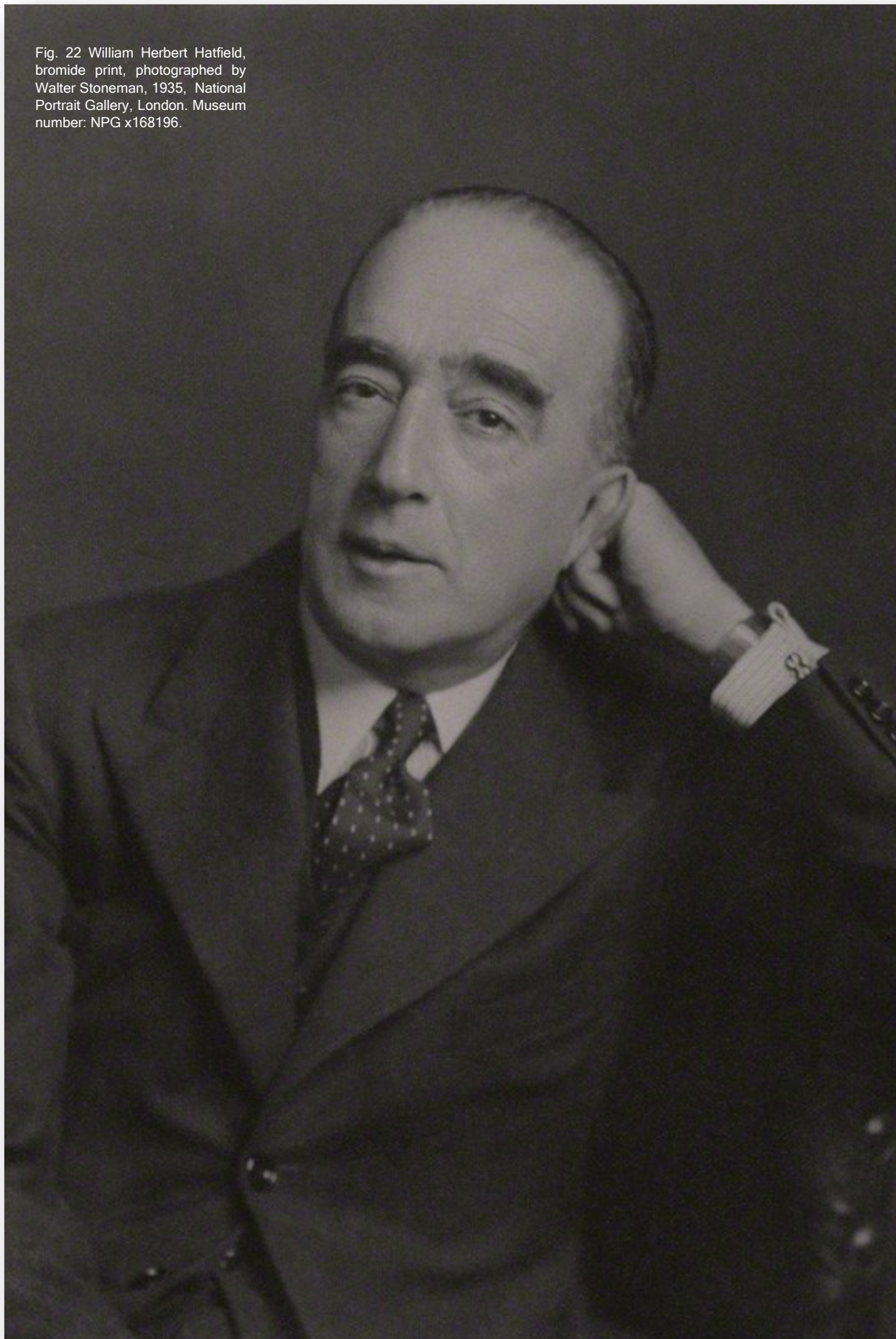
In the atmosphere of Germanophobia that gripped Britain the trade name German silver was dropped and the alloy became commonly known as nickel silver or electro-plated nickel silver (EPNS). In the first year of the First World War, popular trade journals like *Ironmonger* and *The Engineer* commented on the name change as a form of informal propaganda. In its 'Miscellanea' section on 13 November 1914, *The Engineer* reported, 'Since the war began, states the *Ironmonger*, people interested in the electro-plate trade have ceased to describe their base metal as 'German silver,' and have substituted for it the term 'nickel silver.' The change is not likely to cause inconvenience, because many of the makers, workmen, and distributors of electro-plate have long used the latter term.'⁶⁵

Harry Brearley, William Herbert Hatfield and the move to stainless steel.

In 1912, during the arms race with Germany, the metallurgist, Harry Brearley (1871-1948) (*Fig. 21*), was set the task of prolonging the life of gun barrels, which were prone to *erosion*. On the 13th August 1913, whilst experimenting with steel alloys containing varying measures of chromium and carbon, Brearley discovered a *corrosion* resistant steel containing 12.8% chromium and 0.24% carbon.

When Brearley left Brown Firth's laboratories, the metallurgist Dr. W.H. [William Herbert] Hatfield (1882-1943) (*Fig. 22*) took up his role, and subsequently developed *18/8 stainless steel*,⁶⁶ containing 18% chromium and 8% nickel, creating the now ubiquitous steel alloy, which heralded the demise of the German

Fig. 22 William Herbert Hatfield, bromide print, photographed by Walter Stoneman, 1935, National Portrait Gallery, London. Museum number: NPG x168196.



silver metalware industry during the inter-war period.

In the 1920s, stainless steel replaced nickel silver, as it was now called, for the manufacture of flatware and cutlery, and other kitchen utensils, and it remains widely used today (*Figs 23 and 24*). The huge commercial success of 18/8 stainless steel in the latter half of the 20th century revived the primacy of steel in the production of household metalware.⁶⁷

Steel had been the foundation metal used for close-plating before it was largely supplanted by copper and nickel and their alloys, which were used for fused-plating and subsequently electro-plating. This was because the machinability, ductility and corrosion resistance of copper, and, with the advent of electro-plating, its conductivity, made copper more suitable for a wide range of products than steel.

Fine quality close-plated products only became possible with the invention of crucible cast steel by Benjamin Huntsman (1704-1776) in 1740, although it was not until a decade later, in 1751, when the growth

in demand encouraged him to refocus his clock and watchmaking business at Attercliffe near Sheffield to the manufacture of cast crucible steel. Even after the invention of Henry Bessemer's (1813-1898) steelmaking process in 1855, steel was still comparatively heavy to use for domestic metalware, and above all, until the development of *18/8 stainless steel*, it was liable to rust. By adding chromium, Harry Brearley improved the hardness, melting point and corrosion resistance of steel; by adding nickel, Hatfield made steel more elastic.

Neither the addition of nickel or chromium to steel were new innovations. Joseph Wharton, when he was a director at the Bethlehem Iron Company, supplied nickel steel for the manufacture of American warships from 'Harvey armor' invented by Hayward Augustus Harvey in the late 1880s. The Harvey process was in turn superseded by 'Krupp armour,' which was developed at the Krupp Arms Works in Germany in 1893. Krupp armour was much the same as Harveyized

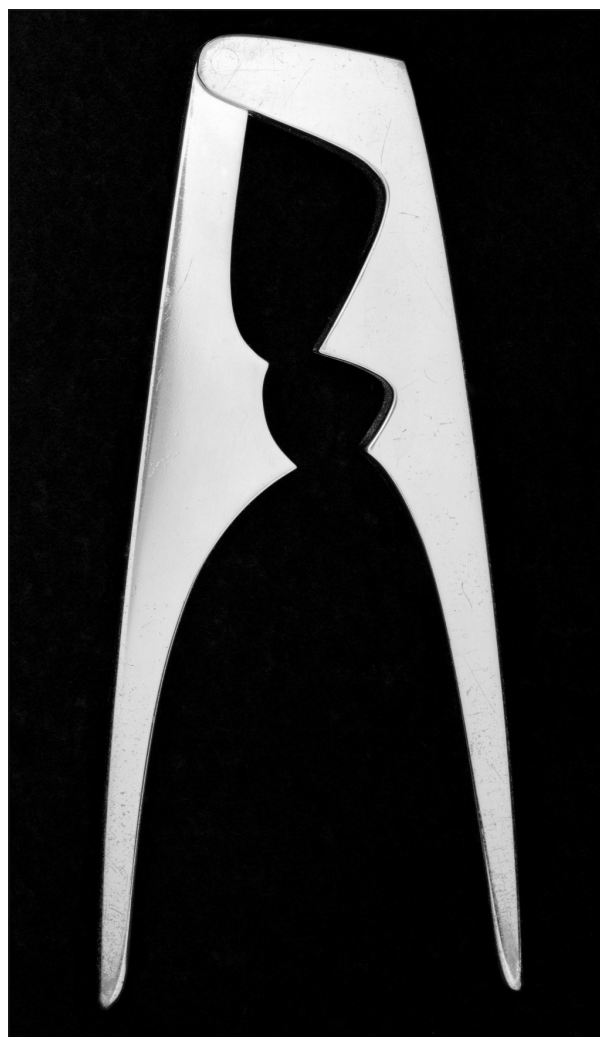
Fig. 23 Boxed set of 'RUSNORSTAIN' (WILL NEITHER RUST NOR STAIN) table knives, 'The Original Stainless Cutlery', steel and ivory, Robert F. Morley Ltd, Sheffield, ca. 1924, picture courtesy of Angus Patterson. Morley's Rusnorstain brand was the first commercially available stainless steel cutlery.



Fig. 24 Nutcrackers, stainless steel, designed by Robert Welch in 1958 and manufactured by J. & J. Wiggin Ltd., Bloxwich, Walsall, West Midlands, between 1960 and 1975, L: 15.5 cm, Victoria and Albert Museum, Museum number: CIRC.408-1960

armour but with 1% chromium added to the nickel-steel alloy. The great innovation of Brearley and Hatfield's combined experimentation was an understanding that it is the combined effect of all the different alloying elements that create the properties of the stainless steel. Chromium is what gives stainless steel its basic corrosion resistance.

The primary reason for adding nickel to steel alloys is to introduce an austenitic microstructure that increases ductility and toughness and helps further reduce the corrosion rate, especially in acidic environments. Nickel is also used to form the intermetallic compounds that increase the strength of steel. The Swedish metallurgist, Professor Bertil Aronsson, has shown how the widespread commercial application of stainless steel in the 1950s, which once again made steel the primary metal used in the production of household metalware, originated in Sweden, like the discovery of nickel by Axel Frederik Cronstedt in 1754.⁶⁸



Acknowledgements:

My thanks to Dr Dan Carter and Jonny Wing at Johnson Matthey Plc for their help in accessing the Johnson Matthey Archive and Visual Bank. My thanks also to Emma Paragreen at Sheffield Assay Office for her assistance in researching William Hutton & Sons in various archives in Sheffield. My thanks also to Tim Horning at the University Archives of the University of Pennsylvania. My special thanks, as ever, to Angus Patterson at the Victoria and Albert Museum for our shared interest and dialogue about the history of metalwork, and his invaluable assistance in researching and editing this essay.

Author:

Dr Alistair Grant is a Teaching Fellow in History at the University of Sussex and a Research Fellow at the Victoria and Albert Museum. He is working on a project to digitize, transcribe and research a visitors' book and sales ledger used by Elkington & Co. at the international exhibitions in Paris, 1855 and 1878, Vienna, 1873, Philadelphia, 1876, which is in the National Art Library. He is also, with Angus Patterson, writing the book *Electro: The V&A, Elkington and the Electrical Revolution*.

Notes:

1. Frederick Bradbury, *History of Old Sheffield Plate: Being an Account of the Origin, Growth, and Decay of the Industry and of the Antique Silver and White or Britannia Metal Trade, With Chronological Lists of Makers' Marks and Numerous Illustrations of Specimens*, Macmillan and Co., Limited, London, 1912, p.7
2. *Ibid.*, p.137
3. R.J. Meyer, "Plattiertes Neusilber," *Nickel: Gmelin's Handbook of Inorganic Chemistry*, 8th edition, Springer-Verlag, Berlin and Heidelberg, 1967, p. 26
4. *Ibid.*
5. "A.D. 1830, July 26. - No. 5963. ROBERTS, Samuel." *Patents for Inventions. Abridgements of Specifications relating to Plating or Coating Metals with Metals*, Printed by Order of the Commissioner of Patents, George E. Eyre and William Spottiswood, London, 1862, p. 24
6. Frederick Bradbury, *Op. Cit.*, p.52

7. A Welby Pugin, *The True Principles of Pointed or Christian Architecture: Set Forth in Two Lectures Delivered at St. Marie's, Oscott*, John Weale, London, 1841, pp. 32-33
8. V&A Archive of Art and Design, London. Ref. Elkington, AAD/1979/3/1/2
9. Frederick Bradbury, *Op. Cit.*, passim
10. *Report from the Select Committee on Manufactures, Commerce, and Shipping; with the Minutes of Evidence, and Appendix and Index*, The House of Commons, London, 19 August 1833, p. 179.
11. *Pigot and Co.'s National Commercial Directory for 1828-9*, J. Pigot & Co., London, p. 801
12. David Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present*, Cambridge University Press, 1969, p. 131. See also Landes' essays: 'French Entrepreneurship and Industrial Growth in the Nineteenth Century,' *Journal of Economic History*, IX, 1949, pp. 45-61 and 'Social Attitudes, Entrepreneurship, and Economic Development: A Comment,' *Explorations in Entrepreneurial History*, VI, 1953-4, pp. 245-272
13. Donald MacDonald, *Percival Norton Johnson: The Biography of a Pioneer Metallurgist*, Johnson, Matthey Co, London, 1951, pp. 33-34
14. *Ibid.*
15. *Ibid.*
16. John Kennedy, *The History of Steam Navigation*, Charles Birchall Ltd., Liverpool, 1903, p. 43
17. Mariana Starke, *Travels In Europe, For The Use Of Travellers On The Continent, And Likewise In The Island Of Sicily; Where The Author Had Never Been, Till The Year 1831. To Which Is Added An Account Of The Remains Of Ancient Italy, And Also Of The Roads Leading To Those Remains*, A. & W. Galignani & Co., Paris, 1832, p. 495 & Appendix p. 506. (Expanded and updated from *Information and Directions for Travellers on the Continent*, 1824)
18. *Robson's London Directory, Street Key, And Conveyance List, Particularizing The Residence Of 60,000 Establishments In London And Its Environs Also A List Of Coaches, Waggons, Vans, With The Names Of The Carriers, Their Route, Inn Or Calling House, And Day And Hour Of Their Departure, Coasting Vessels, Steam Packets, And Inland Navigation: Together With An Alphabetical List Of Public Carriers. For 1833*. 13th edition, W. [William] Robson, London, 1833
19. Donald MacDonald, *Op. Cit.*, p. 36-37
20. *Ibid.*
21. *Ibid.*
22. *Report of the Royal Ontario Nickel Commission*, A.T. Wilgress, Toronto, 1917, p. 102
23. Donald MacDonald, *Op. Cit.*, p. 38
24. *Ibid.*
25. William White, *History And General Directory of the Borough of Sheffield, with Rotherham, Chesterfield, and all the Villages and Hamlets Within a Circuit of Ten Miles Round the Capital of Hallamshire; Including a Topographical Survey of Each Parish and a Variety of Commercial and Statistical Information*, R. Leader, Sheffield, 1833, p. 215
26. *Ibid.*
27. *Papers of Robert Salmon Hutton*, The John Rylands University Library, The University of Manchester. Catalogue entry/Finding aid: GB 133 HUT. Online index: <http://archiveshub.ac.uk/data/gb133-hut.pdf>
28. *Robson's London Directory*. For 1834, 1833
29. Sal ammoniac is a mineral composed of ammonium chloride (NH₄Cl). See: R. Morton and M. Hallett, "Close plating: A Black Country silver plating process," *Historical Metallurgy*, 1989, 23, (1), pp. 41-44
30. *New Triennial Directory of Birmingham*, Wrightson, Birmingham, 1815.
31. Robert Latham and William Matthews (editors), *The Diary of Samuel Pepys: Volume I, 1660*, University of California Press, Berkeley and Los Angeles, 1970, p. 292
32. J. Beauchamp's Monthly Advertisements in Rudolph Ackermann (editor), *The Repository of Arts, Literature, Commerce, Manufactures, Fashions, and Politics*, January - June 1814, Vol. XI. Nos. 61-66
33. C.R Leslie ed., *Life and Letters of John Constable, R.A., With Three Portraits of Constable and Forty-Two Illustrations from Constable's Pictures and Sketches Together with Some Notes on his Work, etc. by Robert C. Leslie*, Chapman and Hall Ltd., London, 1896, p. 269
34. For a full account of the invention and application J.S. Woolrich's magneto-machine to electro-plating see Alistair Grant, "Elkington & Co. and the Rapture of Travel, 1841-1961," *Journal of the Antique Metalware Society*, Vol. 22, 2014, pp. 5-7
35. "Ryland, William, manager, (Elkington, Mason, & Co.) Monument Lane." *Francis White & Co., History and General Directory of the Borough of Birmingham*, printed by John Blurton, Birmingham, 1849, p. 245
36. Arthur L. Bowley, *Wages in the United Kingdom in the Nineteenth Century: Notes for the Use of Social and Economic Questions*, Cambridge University Press/C.J. Clay and Sons, London, 1900.
37. *Ibid.*, p. 120-121
38. Lawrence H. Officer and Samuel H. Williamson, "Five Ways to Compute the Relative Value of a UK Pound Amount, 1270 to Present," *Measuring Worth*, 2014
39. Website, Alessi Flagship, 22 Brook Street, London: <http://store.alessi.com/gbr/en-gb/catalog/detail/crack-nutcracker/am26?ic=5x7YAw%3D%3D>
40. « ... histoire des masses et non de vedettes; histoire vue d'en bas et non d'en haut, surtout, dans le cadre indispensable, dans le cadre primordial des réalités économiques. » L. Febvre, Albert Mathiez : un tempérament, une éducation, *Annales d'histoire économique et sociale*, Volume 4, Numéro 18, 1932, p. 576
41. V&A Search the Collections website. Accessed 14/12/2016: <http://collections.vam.ac.uk/item/O59263/nut-pick-william-hutton-and/>
42. Anonymous, *Manners and Tone of Good Society. Or, Solecisms to be Avoided. By a Member of the Aristocracy*, Frederick Warne and Co., London, 1879
43. V&A Search the Collections website. *Op. Cit.*
44. *Manners and Tone of Good Society*, 1879, p. 94
45. *Ibid.*, p. 77
46. *Ibid.*, p. 96
47. Donald MacDonald, *Op. Cit.*, p. 41
48. *Pigot And Co.'s National Commercial Directory for 1828-9*, J. [James] Pigot & Co., London, p. 795
49. *The London Gazette*, No. 19276, Friday, June 5, 1835, p. 1086
50. *Pigot And Co.'s National Commercial Directory for 1837*, appendix, J. [James] Pigot & Co., London, p. 22
51. *Ibid.*, appendix, p. 8
52. *Ibid.*, appendix, p. 24
53. William Thomas Brande was president of the Chemical Society from 1847-1849. See: William Thomas Brande, "President's Address at the Anniversary Meeting, 30th March 1848. Annual Report of the Council read by the President", *Quarterly Journal of the Chemical Society*, Issue 2, 1 January 1849, pp. 139-155.
54. Pigot, *Op. Cit.*, p.22
55. William Thomas Brande, *Op. Cit.*, pp. 149-150
56. Elkington & Co. Records, Ref. AAD1979/3/1/2, p. 71, G.R. and Henry Elkington, Coating, covering, or plating certain metals, V&A Archive of Art and Design, Blythe House, Olympia.
57. Alistair Grant, *Op. Cit.*, p. 10
58. "The Late Mr. Brooke Evans," *Birmingham Daily Post*, 20th September 1862
59. *One Hundred Years of Progress: History of Henry Wiggin & Company Ltd. 1835-1935*, The Centenary Publication, Lund Humphries, London and Bradford, 1935, p. 19
60. *Ibid.*, p. 20
61. Simon Clow, *The International Nickel Trade*, Woodhead Publishing Ltd., Cambridge, 1992, p. 5
62. *Ibid.*
63. "David Forbes (1828-1876) Obituary," *Iron and Steel Institute*, 1876. See: http://www.gracesguide.co.uk/David_Forbes
64. *Ibid.*
65. *The Engineer*, 13 November 1914, p. 463
66. Also known as SAE 304 stainless steel or A2 stainless steel.
67. See: Bertil Aronsson, On the Origins and Early Growth of Stainless Steel: A Survey with Emphasis on the Development in Sweden, Outokumpu Stainless Research Foundation, Sandviken, 2010. See also: Jan af Geijerstam and Marie Nisser (editors), "The Golden Age of Steel, 1945-1975," *Swedish Mining and Metalworking - Past and Present: The National Atlas of Sweden*, Volume 24, Norstedts Publishing Group, Stockholm, 2011, pp. 146-160
68. *Ibid.*